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Toward strategic usability – user knowledge as a basis for new service development

Master's Thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in Technology.

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Toward Strategic Usability

– User Knowledge as a Basis for New Service Development

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This thesis was written in conjunction with a service development project at the communications service company Elisa between the fall 2007 and spring 2008. The goal was to investigate the concept of strategic usability and find out how usability work could contribute to the process of creating new kind of services to new markets. Traditionally user-centered design has been used to ensuring that the developed products are both useful and easy and pleasant to operate. Strategic usability utilizes the profound user knowledge already at an earlier stage, when deciding what to develop

The empirical part of the thesis comprises of two components. A qualitative study was conducted to find out the current state of usability work at Elisa. Based on the discussions with 13 project and business managers, a general view of the role of usability in the product life-cycle model was formed. The other empirical component presents the experience gained from a service design project where a concept for the web-service Game Shelf was created. The roots of the project lie in the ethnographic Customer day study, in which Elisa employees spent a day observing the life of the customers. The approach to the design was highly user-centric and user experience was specifically considered throughout the process.

In the thesis it was noticed that even though Elisa is ambitious about discovering new business opportunities and becoming the service leader instead of competing with prices, the existing processes are not always suitable for iterative, user-centered design. Moreover, usability lacks an official role in the decision-making process. This is why the final products often do not meet the original needs as well as they could. The Game Shelf service has not been realized but the design process demonstrated how early focus on users was helpful when designing a service concept that would solve the problems of the existing competitors. The approach was also beneficial for recognizing needs that had not been addressed at all by the earlier services.

Keywords

Strategic usability, User-centered design, User experience, Web design

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Tämä työ tehtiin Elisa Oyj:ssä tuotekehitysprojektin lomassa syksyn 2007 ja kevään 2008 aikana. Tavoitteena oli tutustua strategisen käytettävyyden käsitteeseen ja selvittää, kuinka sitä voitaisiin hyödyntää luotaessa uuden tyyppisiä palveluita uusille markkinoille. Perinteisesti käytettävyyssuunnittelun roolina on ollut varmistaa, että kehitettävät tuotteet ovat tarkoituksenmukaisia ja helppoja käyttää sekä tarjoavat miellyttävän elämyksen. Strategisessa käytettävyydessä syvällistä käyttäjäymmärrystä hyödynnetään jo aiemmassa vaiheessa: päätettäessä, millaisia tuotteita aletaan ylipäänsä kehittää.

Työn empiirinen osa koostuu kahdesta kokonaisuudesta. Käytettävyystyön roolia Elisalla tutkittiin kvalitatiivisen haastattelututkimuksen avulla. 13 päällikkö- ja johtajatason edustajan kanssa käytyjen keskustelujen pohjalta luotiin käsitys käytettävyyden roolista Elisan tuotteiden elinkaarimallissa. Toinen empiirinen kokonaisuus esittelee tuotekehitysprojektista saatuja kokemuksia. Hankkeessa kehitettiin Pelihylly-nimisen web-palvelun konsepti. Alkuperäisenä kimmokkeena projektille oli Elisan syksyllä 2006 toteuttama etnografinen Asiakaspäivä-tutkimus, jossa Elisan työntekijät jalkautuivat päiväksi asiakkaiden pariin selvittämään näiden arjessa kohtaamia ongelmia. Pelihyllyn suunnittelussa seurattiin tiiviin käyttäjäkeskeistä lähestymistapaa, ja käyttökokemus oli merkittävässä osassa palvelun suunnittelussa.

Diplomityössä havaittiin, että vaikka Elisa suhtautuu kunnianhimoisesti uusien mahdollisuuksien tunnistamiseen ja haluaa hintakilpailun sijaan toimia palvelujohtajana, varsinaiset prosessit eivät aina sovellu iteratiiviseen käyttäjäkeskeiseen suunnitteluun. Myöskään käytettävyyden roolia ei ole varsinaisesti määritelty päätöksentekoprosessissa. Tämän vuoksi lopulliset tuotteet eivät usein vastaa alkuperäiseen tarpeeseen niin hyvin kuin olisi mahdollista. Pelihyllyä ei ole toteutettu valmiiksi tuotteeksi asti, mutta suunnitteluprosessi havainnollisti, kuinka alkuvaiheen tarkkaavaisella käyttäjien ymmärtämisellä kyettiin kehittämään palvelukonsepti, joka ratkaisi olemassa olevien kilpailijoiden ongelmia. Lisäksi se oli hyödyksi tunnistettaessa tarpeita, joita aiemmat palvelut eivät olleet huomioineet lainkaan.

Avainsanat

Strateginen käytettävyys, Käyttäjäkeskeinen suunnittelu, Käyttäjäkokemus, Web-suunnittelu

Preface

Little did I know what would follow from the email I sent to Elisa on one Tuesday evening, asking for a job. I ended up getting an opportunity to work with some great people and get a peek at the reality of a major Finnish company in a process of reinventing itself. This provided a suitable environment for investigating the ideas of combining user-centered design approach with new business development.

I want to thank professor Marko Nieminen for first exposing me to the topic of strategic usability and for being supportive and flexible later on. My instructor Mr. Antti Perttula I want to thank for his positive and energetic attitude, and specifically for all the practical arrangements. Without his support I might not have had the opportunity to discus with the Elisa managers, whom I thank for their time and open attitude toward my work.

The process would not have been so enjoyable were it not for my team members. I want to thank Janne, Ville, Laura, Jaakko, Tero, Jari, and Marja with whom I had the pleasure to work along the way. I am also thankful to various people who either answered to my emails or took part in the conversation in my blog and provided me with some valuable insight and suggestions.

Lastly, I want to thank my family and all my near and dear ones. You know who you are, as I am going to make you read what I have written.

It was not always easy and if there ever was a next iteration, I would certainly do many things differently. I got the opportunity to learn a lot – and have fun while doing it. I have been lucky.

In Espoo, June 22, 2008[1]

Matias Pietilä

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[1] To clarify the date issue: the document was finished in June 22, 2008 and reflects the issues as they were at that time. The thesis was officially submitted for examination on January 4, 2010.

Contents

Abbreviations

GUI	Graphical User Interface
HCI	Human–Computern Interaction
ROI	Return on Investment
UCD	User-Centered Design
UE	Usability Engineering
UI	User Interface
UX	User Experience

1 Introduction

Usability engineering is a methodology that has matured during the past couple of decades to provide solid means of creating products and services that are easier and more efficient to operate for different kinds of users. The concept of user experience takes this further and instead of merely concentrating on the tasks to be completed, it stresses the holistic positive experience that the usage of the product provides to the user.

The benefits of user-centered design are not restricted to the end-users, as the producer also gets its share of advantages. For instance, development costs are lower when problems are fixed earlier and support costs are reduced when users have fewer problems with operating the products. Moreover, the perceived quality also improves the brand image. In general, traditional usability methodology is good at answering the question *how* to implement things in the most optimal way.

It has been demonstrated that the earlier the usability activities are introduced to the development process, the more drastic their effects are. The emerging school of *strategic usability* takes this to the extreme by saying that users should be studied already before deciding on developing new products. This brings usability professionals to the field earlier occupied by marketing professionals and strategic planners – to contribute to the questions of *what* to develop.

Meanwhile, it has been noted on the business side that modern day technologies are so complicated that the competences of the marketing departments alone are insufficient to create truly usable products. No longer is it enough to simply listen to the customers and implement each and every feature they might request, as this leads to *featuritis*, a complicated system full of features that few know how to operate and even fewer actually use.

A bridge between technical implementators and business-oriented marketing departments seems to be needed – and this is what the user experience design is all about. It has been learned that technology alone is hardly a compelling reason to buy a product for most customers. The vast majority of people want simple total solutions to their needs. These do not come up to be without explicit design.

What is more, history shows that companies, however customer-centric, have continuously difficulties in adapting to the fundamental changes taking place in the marketplace because of the so-called *disruptive* technologies. Catering for the needs of current customers, the companies often ignore the fact that emerging technological solutions might open new possibilities for people who they have not earlier identified as potential customers. In the end, the new technologies tend to mature enough to addres the needs of the current customers as well, forcing the unalert companies to the small high-end niche markets.

Recognizing the opportunities for strategic innovations brought by disruptive technologies involves better knowledge of the actual needs of the users and proactive actions based on this knowledge. This is where strategic usability work comes to play. Seizing these opportunities often requires closer collaboration with other companies and *open innovation*; innovation freed from the chambers of in-house R&D laboratories and based on the actual market needs, not just the technologies that the company has already developed.

This study finds out how these issues are seen in a company that is leaving the old technology-centric view behind and striving to become genuinely user-driven. Discussions with a wide assortment of key personnel provide an insight into challenges that still hinder usability work in the organization – even though easiness is the official mantra of the company. A case study is also presented. It shows how ethnographic user study was used as a basis when designing a new web-based entertainment service and how user experience was extensively considered along the way, starting from the earliest stages of the process.

1.1 Objectives and scope

This study seeks to find out what kind of role usability work could have when developing new services, based on latent needs of the users. The focus is on the consumer business and specifically in new service development. The theory review part provides and overview on the field of usability, ranging from traditional usability to user experience and finally to strategic usability. Further, it seeks to find out how usability work might have a role in contributing to innovation of new services.

The two research questions that are to be answered in the empirical part are:

1. What is the current role of usability work in Elisa and is it considered adequate?
2. What benefits can be gained from an early focus on user experience when developing new services and discovering product opportunities?

The first question is answered based on the internal interviews carried out in the company. Examples of the benefits will be demonstrated based on the experiences of the case study, respectively. Based on the results, some suggestions are given how the situation could be further improved.

1.2 Structure

The theory part of the study is presented in chapters 2 and 3. Chapter 2 provides an overview of usability, user experience and user-centered design. Chapter 3 connects usability to a bigger picture and shows how it has two important business effects: First, paying attention to usability is necessary for technological innovations to spread. Second, profound user-knowledge can be utilized when seeking new business opportunities, based on the latent needs of the users.

Chapter 4 presents the methodology and results of the internal interview study and chapter 5 documents how the project Game Shelf was executed, following the ideas presented in the theory section.

In chapter 6 the results are analyzed. Chapter 7 contains further discussion.

2 Usability and User-centered Design

This chapter starts the theory review part by providing an overview of the terms and concepts related to usability. In addition to conventional usability, wider concepts of user experience and service design are presented. User-centered design process is visited along with an overview of usability methodology, including methods of user testing and usability inspection.

Usability engineering (UE) is a multidisciplinary field that has developed out of human factors engineering. Human factors engineering emerged during the Second World War when equipment complexity began to exceed the human limits of safe operation (Butler 1996). The main focus was in studying how pilots could better operate their complex machinery. This led to the introduction of the first pilot-centered design processes.

The scientific base of usability engineering is largely in the experimental psychology of human information processing but since then it has been most often applied in software design (Butler 1996). Usability engineering can be seen to be a part of a larger discipline of human–computer interaction (HCI) which is concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them (Hewett & al. 1996).

2.1 Defining Usability

To start off, a definition for usability is needed. *Ease of use* and *user friendliness* are qualities often required by users. These terms are widely used and implicitly understandable but lacking a precise definition, they are hardly supportive when trying to develop products that fulfill the request (Quesenbery 2001). Moreover, these terms convey an image too narrow, by focusing on quick learnability and being easy for novice users and ignoring the efficiency requirements of more advanced users (Norman 1998, 181).

For a scientific approach a measurable definition is needed. According to the International Standard ISO 9241-11 (1998) usability is the extent to which specified

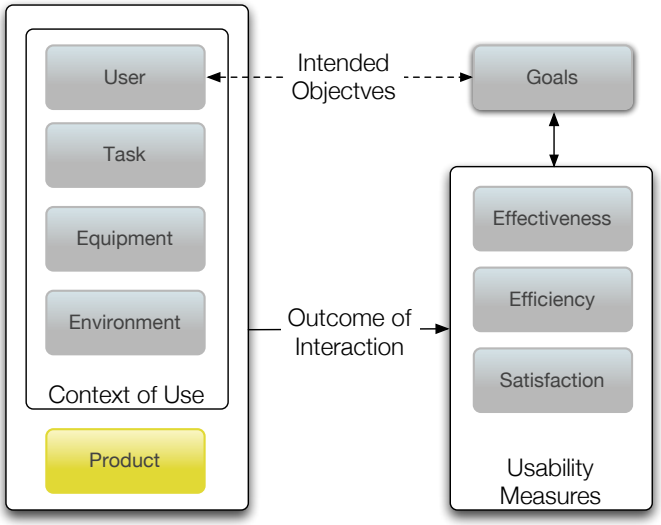

Figure 1 Usability according to ISO 9241-11. (1998)

users can use a product to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use. In this definition *effectiveness* means the accuracy and completeness with which users achieve specified goals. *Efficiency* means the amount of resources involved when using the product. This includes resources like time, money, and people. *Satisfaction* is defined as freedom from discomfort, and positive attitudes towards the use of the product.

Since interaction rarely takes place in a void, the definition also takes the context of use into account. The context further includes the users, their tasks and equipment as well as the environment – both physical and social – in which the product is operated. All these aspects should be considered when designing and evaluating the product (Figure 1).

The ISO definition provides some characteristics of a usable system but is still not detailed enough for evaluating whether a given system is usable (Leventhal & Barnes 2007, 27). In order to better specify how different characteristics fit together and how they contribute to usability, a model of usability is utilized. The following usability models are specifically apt for *measuring* the usability. Keinonen (1998) remarks that in addition to seeing usability as a measurement, it can also be considered a design approach and a product attribute.

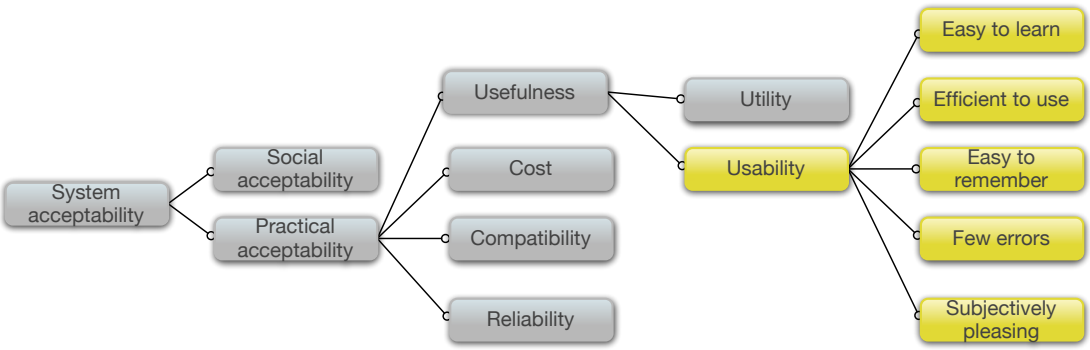

Figure 2 Usability as a component of system acceptability. (Nielsen 1993)

2.1.1 Nielsen's model

Jacob Nielsen has suggested one of the most cited models (Nielsen 1993, 23-36). He divides usability into five individual components (Figure 2). A usable system should be:

- easy to learn
- efficient to use
- easy to remember
- error preventive
- subjectively pleasing.

Learnability means that the system should be easy to learn for new users. *Efficiency* means that using the system with high productivity is possible once the user has learned the system. *Memorability* deals with users coming back to the system after a while and being able to use it without learning everything again. *Error prevention* means on one hand that errors occur rarely and on the other hand that recovering from errors is straightforward. What is more, catastrophic errors must not occur at all. *Satisfaction* means that system is pleasant to use.

Nielsen gives some ideas how one can measure different components. He does not weight the components but recognizes that depending on the situation, some are more important than the others. Often these dimensions of usability are also contradictory, e.g. a highly efficient command line interface might be inherently difficult to learn for beginners. (Nielsen 1993, 41)

The important aspect of Nielsen's model is that it positions usability in a larger framework, relating it with other concerns of software engineering (Leventhal & Barnes 2007, 28). In Nielsen's model usability and utility are sub-concepts of usefulness as suggested by Grudin (1992). This is similar to Davis (1989) who defines in his technology acceptance model (TAM) that perceived usefulness and perceived ease of use are the criteria that define whether users accept a product.

In Nielsen's framework utility deals with the product meeting the specified need of the user. If the system is low on utility, its usefulness is also low and it does not matter if it is usable or not. Hence, it is worth noticing than in Nielsen's terms, usefulness is close to what is called usability in ISO definition. In Nielsen's model it is possible for the product to be highly usable and useless at the same time, whereas the ISO definition of usability explicitly includes utility.

Nielsen goes on to list usefulness as an attribute of performance together with cost, compatibility, and reliability. These form practical acceptability that coupled with social acceptability finally defines the total acceptability of a system.

2.1.2 Shackel's model

Nielsen's model is rather analogous to an earlier one, proposed by Shackel (1986). He divides usability into four dimensions: effectiveness, learnability, flexibility and attitude. *Effectiveness* and *learnability* correspond largely to Nielsen's components with the same names, with the exception that memorability has been included into Shackel's learnability. Shackel's *attitude* component is analogous to Nielsen's satisfaction, as it is defined as "being within acceptable levels of human cost in terms of tiredness, discomfort, frustration and personal effort."

Of Shackel's dimensions of usability *flexibility* is something not covered by Nielsen's model. Defined as "allowing adaptation to some specified percentage variation in tasks and/or environments beyond those first specified," it stresses the importance of the context. As the designers' possibilities to affect the context are often limited, the solution is to design for adaptation.

2.1.3 Eason's model

Eason's model (Eason 1984) highlights the importance of context even further. Here usability is determined by three factors: the interaction of the system in question,

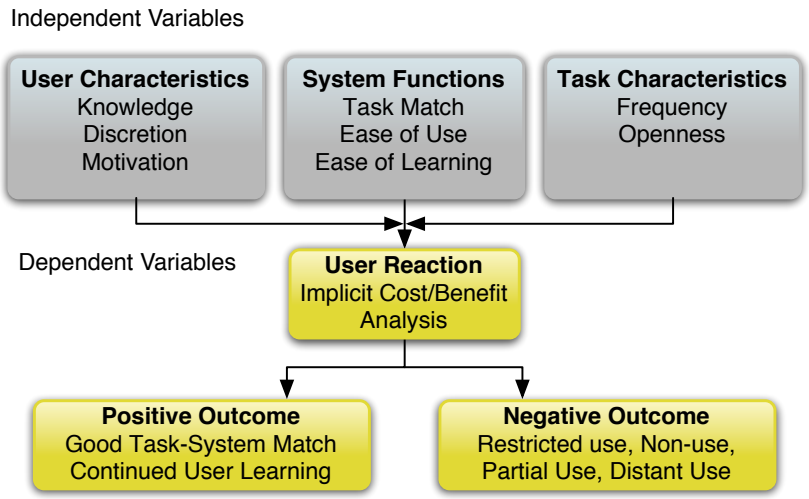

Figure 3 Eason explicitly separates the independent and the dependent variables. (1984)

characteristics of the user and characteristics of the target task (Figure 3). That is to say, one cannot measure usability without considering the users and the tasks they are trying to accomplish.

The characteristics of the system component are implemented by the user interface. Similarly to Nielsen and Shackel, Eason lists attributes like *ease of use* and *ease of learning* but also *task match*, which is more akin to Nielsen's utility. In this definition, ease of learning means largely the same than learnability in earlier models and ease of use deals with the usage of the system once it has been mastered by the user.

Eason points out that the user interface is usually the variable that offers the most flexibility for change because components of the task and the user are usually fixed and set the context for the interface. The characteristics of the task comprise of two components: frequency and openness. *Frequency* means how often the given task is done by the user. *Openness* describes the nature of the task: whether the task is open-ended and how many options it has. Recognizing the nature of the task affects the design of the system component.

A routine task (not open) which is done frequently would certainly benefit from effectiveness, whereas a task with a large amount of variability (open) carried out only infrequently should be made easier by providing better guidance. It is worth

noticing that also Nielsen's model weights different components of usability differently based on the situation but Eason's model makes this more explicit.

User characteristics are seen to be a sum of three components: *knowledge, motivation*, and *discretion*. The knowledge that the user possesses and applies to the task may be appropriate or inappropriate. The amount of motivation the user has explains how much effort she is willing to put into overcoming the problems she might face with the product. When she does not absolutely need to use a product, she will more likely give up trying when facing problems. The final user characteristic in Eason's model of usability is discretion. This refers to the user's ability to exploit a certain feature of the system. Leventhal and Barnes have considered these user characteristics limited and suggest the addition of learning style, problem solving skills, age, physical characteristics, and skills (2007, 31).

To sum up, there are many ways to put usability into words but to measure it by experiments and make decisions based on the results, one needs to have a model. All the presented models suggest that there is causality between the independent variables that are altered and the effects they have on the dependent variables that are measured. This is specifically clear from Eason's model but they all share the same fundamental idea. When basing one's assumptions on a model and its implications about the causality, the usability engineer does not need to guess but he can ground his decisions on the earlier research. (Leventhal & Barnes, 2007, 32-33)

2.2 User experience extends usability

User experience (UX, UE[2], or UEX) is a concept that has gained attention during the past decade. Although sometimes used loosely as a synonym to usability, it is usually seen as an extension to it (Stewart 2008). One of the early attempts to define the term is that of Alben (1996) who defines UX as:

> all the aspects of how people use an interactive product: the way it feels in their hands, how well they understand how it works, how they feel about it while they're using it, how well it serves their purposes, and how well it fits into the entire context in which they are using it.

[2] UE is also widely used to mean *usability engineering*. UX seems to be the currently most used acronym and unlikely to be mixed with others, though some dislike its use of the letter x. In this document the acronym for user experience is UX.

Hassenzahl and Tractinsky (2006) summarize the premise for the rise of UX as follows: "As technology matured, interactive products became not only useful and usable, but also fashionable, fascinating things to desire." While UX is widely accepted by practitioners and researches, it is still criticized for being vague and elusive. They believe that the reason that UX still rarely enters the relevant academic journals is largely due to lack of empirical research.

Donald Norman has had an important role in popularizing the term by becoming the User Experience Architect at Apple already in 1993 (Knemeyer & Svoboda, 2005). He explains the original idea behind the concept and answers to the critique it has received: "I invented the term because I thought Human Interface and usability were too narrow: I wanted to cover all aspects of the person's experience with a system, including industrial design, graphics, the interface, the physical interaction, and the manual. Since then, the term has spread widely, so much so that it is starting to lose its meaning." (Merholz 1998)

It is worth noticing that the ideas presented by UX are hardly new. As Hassenzahl and Tractinsky (2006) point out, the requirement for systems to work pleasantly is already present in the definition of usability but traditionally the attention has been limited to analyzing and evaluating how the user succeeds in completing tasks and not explicitly addressing the satisfaction component. Another side of the matter is that UX is not an excuse to neglect the issues earlier defined important for the usability. As an extension to usability, user experience only adds new requirements to be considered.

An overview of the concept of user experience is provided by presenting the framework, proposed by Hassenzahl and Tractinsky (2006) and by linking it to other related UX definitions. The model is comprised of three components (Figure 4):

- beyond the instrumental
- emotion and affect
- the experiental. (Hassenzahl and Tractinsky 2006)

2.2.1 Beyond the instrumental

This component emphasizes the notion that that the original task-centered approach to usability is too narrow. For instance, the traditional utilitarian mindset hardly sees

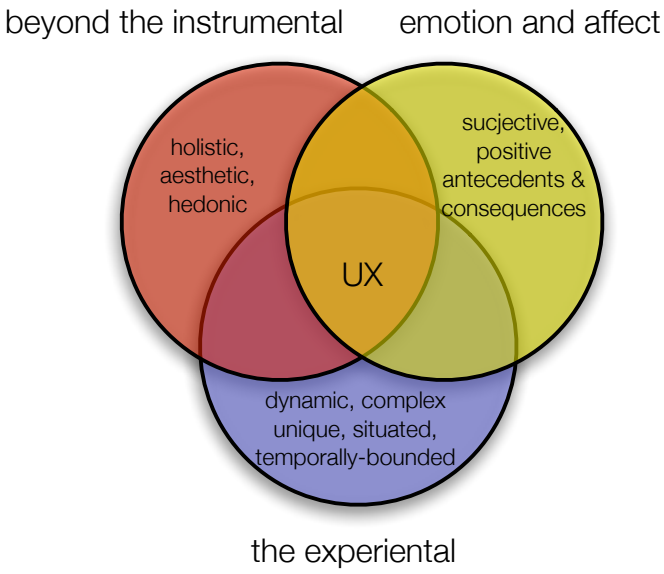

Figure 4 The three dimensions of user experience. (Hassenzahl & Tractinsky 2006)

the value of aesthetics as a quality of technology. Hassenzahl (2003) suggests that in the future HCI should be concerned about both the traditional pragmatic aspect and the hedonic one. In his attempt to define UX, Alben (1996) identifies beauty as an important aspect of the overall experience. Hassenzahl and Tracktinsky notice, referring to Maslow (1954) that beauty satisfies a general need and conclude that beauty indeed is an end rather than means.

Besides beauty, several other non-instrumental needs have been considered valuable. Gaver and Martin (2002) argue that the needs of surprise, diversion and intimacy should be better addressed by technology. Indeed, the highly subjective concept of wow factor[3] used especially on the field of marketing deals with positive surprises.

2.2.2 Emotion and affect

The second component stresses the importance of user's emotions in the interaction. There are two perspectives to dealing with emotions. One emphasizes the importance of emotions as consequences of product use, whereas the other sees the emotions as a basis for product use and antecedents for action. One of the better-known representatives of the latter line of research is Donald Norman who argues (2004)

[3] Wow factor can be loosely defined as the degree to which the first impression of something makes a person say “Wow!” (Usability First, 2008)

that attractive things indeed work better. In the experiments by Kurosu and Kashimura (1995) and Tracktinsky (1997, 2000) different button layouts for automated taller machines (ATM) were tested. It turned out that the ones that were considered aesthetically more pleasing were also found easier to operate – despite the fact that the actual interaction logic in different implementations was identical.

Norman explains this result, originally considered highly surprising, by the fact that the human emotional system changes how the cognitive system operates. Ashby, Isen, & Turken (1999) have shown that being happy broadens the thought processes and facilitates creative thinking. On the other hand, when people are anxious, their thought processes narrow to support focusing only on aspects relevant to the situation. This is useful when escaping a danger but not so when trying to figure out how to use an interactive system.

As Norman puts it: when the first try fails, most people try again, only with more effort. In the world of computers, however, the correct approach would be to look for alternative solutions. Repeating the same action over and over with no avail gets the emotional state of the user increasingly focused, making it more unlikely that she ever finds the right solution. On the other hand, when feeling happy, the user is more likely to think creatively when problems appear and minor difficulties often go unnoticed. (Norman 2004, 19-20)

2.2.3 The experiental

The last component of user experience in the model emphasizes two aspects of technology: situatedness and temporality. The experience is seen as a combination of the product itself and the internal states of the user, including moods and expectations, all extended over a period of time with a specific beginning and end. These elements are futher assumed to be able to interact with each other. This is analogous to the model, proposed by Mäkelä and Fulton Suri (2001), where experience is seen to result from a motivated action in a certain context. Previous experiences affect the present experience, which in turn has an influence on the future expectations (Figure 5).

Virpi Roto (2007) stresses that the user experience does not take place only during interaction with the product. The expected experience that happens before interaction and the overall experience that the user has after interaction should also be taken into

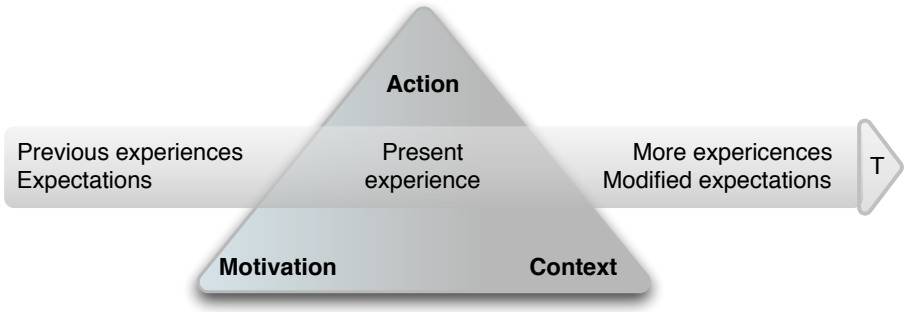

Figure 5 Previous experiences affect the present experience which has as influence on the future expectations, respectively. (Mäkelä & Fulton Suri 2001)

account. As an example of the overall experience, Roto mentions that the user experience of a shirt is different when one learns that it has been manufactured by child labor.

Hassenzahl & Tracktinsky point out that if one assumes that the experience is caused by the product rather that the situational aspects, there seems to be a need for UX to change one of the fundamental assumptions of HCI. Traditionally it has been seen that interactive products should be transparent in a way that a well designed product works so seamlessly that one does not even pay attention to it. The paradox is, it is hardly possible to create a positive experience and go unnoticed at the same time. Along these lines, Hassenzahl & Tracktinsky conclude their analysis by stating that one of HCI's main objectives in the future is to contribute to our quality of life by "designing for pleasure rather than for absence of pain."[4]

2.2.4 Kano model and the excitement needs

Another model to shed some light on the concept of user experience and the role of positive surprises is that suggested by Kano & al. (1984). Coming from the field of quality engineering, it does not specifically mention usability but it has turned out be useful in illustrating the role of user experience (Olsen 2003). In Kano model the perceived quality of a product is determined by three types of user needs: *basic needs*, *performance needs* and *excitement needs* (Figure 6).

Basic needs are latent. Users do not mention these when being interviewed because they are taken as given. When one buys a car, one expects it to have wheels. The

[4] This can be contrasted to the ISO definiton of usability where satisfaction is defined as "*freedom from discomfort*, and positive attitudes towards the use of the product."

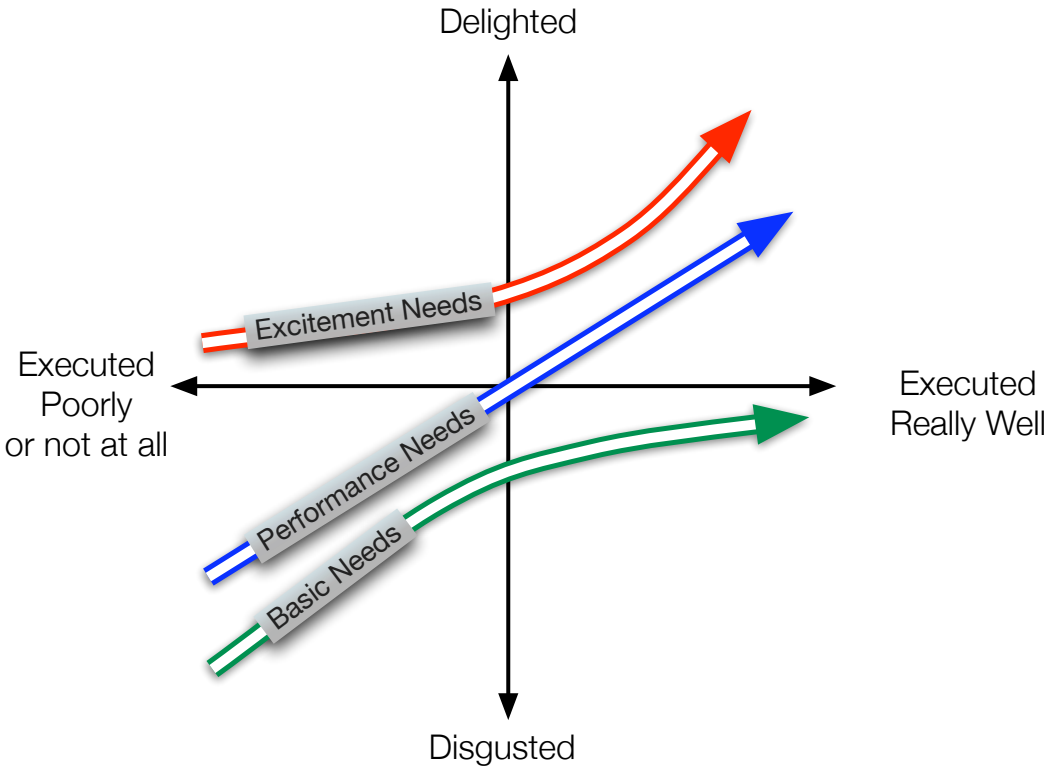

Figure 6. According to the model by Kano, fulfilling different kinds of needs results in different amounts of delight. (Kano 1984)

nature of basic needs is that they lead to dissatisfaction when not met – hardly anyone accepts a car without wheels. When the needs are met, no specific positive sense of satisfaction is caused, either.

Performance needs are the ones that get articulated in surveys. These include separate features and quantifiable performance metrics. How fast a car will go, how many songs an MP3 player holds – or how many clicks it takes to complete a task. These are the features that act as differentiators in the current marketplace. The nature of performance needs is that they are additive and move the perceived quality from dissatisfaction toward satisfaction.

Excitement needs are what the user experience and wow factor are all about. They are also latent in that they are something that users do not know that they want but desire once they see it. Not fulfilling them leaves the perception of quality to neutral level. Fulfilling them, on the other hand, often results in higher levels of satisfaction than fulfilling performance needs ever would.

The factors that decrease dissatisfaction are often not the same that increase the satisfaction. Recognizing the role of different features is crucial when deciding where to concentrate the development recourses. Moreover, the system is dynamic in a way that the needs of the users increase all the time. What was exciting yesterday is seen as a performance need today and will be requested tomorrow. For cars the design and appearance have been commodities for decades, whereas many a consumer still buys computers solely on the basis of performance values.

The rise of user experience demonstrates how Kano model applies to the field of usability and HCI as well: on the web, usability, accessibility and standard-compliancy are nowadays largely taken as a given. Failing to deliver them is disappointing – getting them right is hardly anything special.

This is implied by the analysis on trends about return on investment (ROI) of usability. During past six years the overall quality of web sites has increased, as many of the basic usability problems have been fixed and certain best practices have emerged (Nielsen 2008). As a result the conversion rates of web services have improved – and investing on basic usability is not as profitable as it used to be. The next frontier of differentiation is to improve the overall user experience, which in turn affects loyalty rates.[5]

All in all, user experience is a broader concept than mere usability. Though some practitioners dislike the term, it has gained visibility in recent years and there have been attempts to formalize the term and come up with a shared definition (Law & al. 2008). Another part of the institutionalization of UX is that the next rendition of the ISO definition of usability, ISO 9241-210, will better acknowledge its existence. According to Tom Stewart (2008), the new standard will include "all aspects of the user's experience when interacting with the product, service, environment or facility" and it will be pointed out that "it is a consequence of the presentation, functionality, system performance, interactive behaviour, and assistive capabilities of the interactive system. It includes all aspects of usability and desirability of a product, system or service from the user's perspective."

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[5] See more discussion about usability ROI in the chapter *Cost-justifying usability*

2.3 Service Design

Traditional usability engineering has its roots in the study of human–computer interaction and the models of usability have therefore been mostly applied when designing interfaces for computer systems. The introduction of user experience, however, extends the concept and takes a more holistic view on the idea of experience. No longer is it just about the product but about the situation as a whole as experienced by the user. Some practitioners prefer talking about users only when there is a computer-based system involved and rather refer to *experience design* in other cases. Others see no problem in calling the subject user regardless of the type of the system. Roto for instance provides an example of utilizing the concept of UX when analyzing the experience one gets when eating cake (Roto 2007).

Service design is another approach to the issue. It has emerged in the early nineties and is largely based on the heritage of the physical industrial design (Mager 2004, 3). It deals with questions of innovating and developing services with the methodology of design. The process it suggests is highly similar to that of user-centered design, applied by usability practitioners. Users are involved in the design process, concepts are developed and prototypes created much like in the established user-centered design methodologies.

A service can be defined as a chain of activities that form a process and have value for the end user (Saffer 2007, 175). Services differ from objects by being more abstract in nature. This is also reflected in the way how the process of service design has some distinctive features. There are usually physical objects involved in the process but the service is more than their combination. Let us consider a railroad journey as a service. Sure enough, the interface of the ticket machine is designed, based on the best practices of interface design. The signage at the railway yard needs to be visible. The seats of the car are designed ergonomically. But these things alone do not guarantee a successful service.

Following characteristics (Saffer 2007, 175-176) illustrate how services differ from products.

Intangible. Although services tend to utilize objects, the service itself is ephemeral.

Provided ownership. Services are rather consumed than bought. Customers who use a service might end up getting something concrete out of it but they essentially pay for the value they receive, not for the product.

Co-created. Service is created by the interaction of the user and the service provider and involves them both.

Flexible. Some standardization is needed but in essence each new situation requires the service to adapt to it

Time based. Services are processes that take time, which cannot be recovered if it is lost.

Active. Services involve human labor and are thus difficult to scale. What is more, the services are consumed at the same time than they are produced (Grönroos 2007, 27). This also means that services cannot be stored (Grönroos 2007, 82)

Fluctuating demand. The demand for services tends to vary by time.

Because services cannot be touched as such, they are operated through various *touchpoints*. When visiting a store, the store itself is a touchpoint as is the sign that drew one to the store, the salesperson in the store, what the salesperson says, and the packaging the purchased product arrives in. In general, touchpoints can be divided into four categories: environments, objects, processes, and people. (Saffer 2007, 176) Service design provides the means of designing these components in the most optimal way.

2.4 User-Centered Design

The fundamental reason why many products and services end up becoming hard to use is in the mindset that usability is just a feature among others that can be included after the product is otherwise finished. To succeed in developing usable results, the starting point should be the need of the user, not technology, and the complexity should be that of the task – not of the tool. (Norman 1998, 204) Alan Cooper (1999) goes as far as to say that *the inmates are running the asylum*, meaning that the developers like to design products that appeal to other developers but are incomprehensible for most people.

2.4.1 The insufficient linear process

When aiming to develop products and services based on the user needs, the traditional technology-centered approach does not yield the optimal result. One such inherently flawed approach is the widely used waterfall method (Royce, 1970), which presents the development process as a linear continuum where each stage has to be fully completed before proceeding further. [6]

There are several reasons why this kind of approach is not recommended. The fundamental flaw is according to McConnell (1993, 161-162) that many of the problems typically encountered in a design process are of *wicked type*, i.e. it is hard to formalize the question before one has an idea about the solution. Parnas & Clements (1985) list the following reasons why such a rational software design process is rather idealistic than realistic:

- In most cases the people who commission the building of a software system do not know exactly what they want and are unable to tell us all that they know.
- Many of the details only become known to us as we progress in the implementation.
- Some of the things that we learn invalidate our design and we must backtrack.
- Even if we knew all of the relevant facts before we started, experience shows that human beings are unable to comprehend fully the plethora of details that must be taken into account in order to design and build a correct system.
- Even if we could master all of the detail needed, all but the most trivial projects are subject to change for external reasons.
- Human errors can only be avoided if one can avoid the use of humans.
- We are often burdened by preconceived design ideas, ideas that we invented, acquired on related projects, or heard about in a class. (– –)
- Often we are encouraged, for economic reasons, to use software that was developed for some other project. In other situations, we may be encouraged to share our software with another ongoing project. (– –)

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[6] It is no accident that the process diagram is missing. The original article that featured the waterfall model, presented it as an example of a process that does not work. This did not prevent it from being widely adopted nonetheless.

One way to alleviate the problem has been to include a testing period to the process. Instead of testing just the technical quality of code to find programming errors and bugs, testing with users has been introduced after the coding phase is complete. This kind of user testing that takes place after the programming effort is often called *user acceptance testing* (UAT).

Usability practitioners like to point out that user acceptance testing is far from adequate. At this point the changes to the system are slow and expensive, hence only minor adjustments can be made. However, 80% of the usability of an interface depends on the underlying structure (Schaffer 2007, 20). By this point many design decisions have been made based on the assumptions of the developers and the role of the usability expert becomes little more than that of a design police. Calling in the police after the crime has already happened is certainly not the optimal approach. (Norman 1998, 208) Garrett even argues that the word *acceptance* alone is very describing. The users are not asked if they like a product or if they would pay for it– let alone if they find it desirable – but only if they are ready to accept it. (2003, 168)

Testing has its place and for this there exist the established methodology of usability testing. Nevertheless, testing is no substitute for profound design that precedes the coding phase and finds out not only the tasks the product is required to support but also the goals the actual users want to achieve. (Cooper 1999, 256-258, Garret 2003, 168-169, Schaffer 2007, 32) The evolution of the development processes is presented in Figure 7.

2.4.2 User-centered design is iterative

User-centered design (UCD) is a design methodology where the needs and the characteristics of the user are considered extensively throughout the design process (UPA, 2008). Realistically, compromises are needed every now and then, but the premise of the methodology is that these compromises never happen by accident (Garret 2003, 16). The iterative nature of the methodology takes care on one hand that features that get included have a real need and on the other hand that they get implemented in such a way that people understand how to use them. Another term,

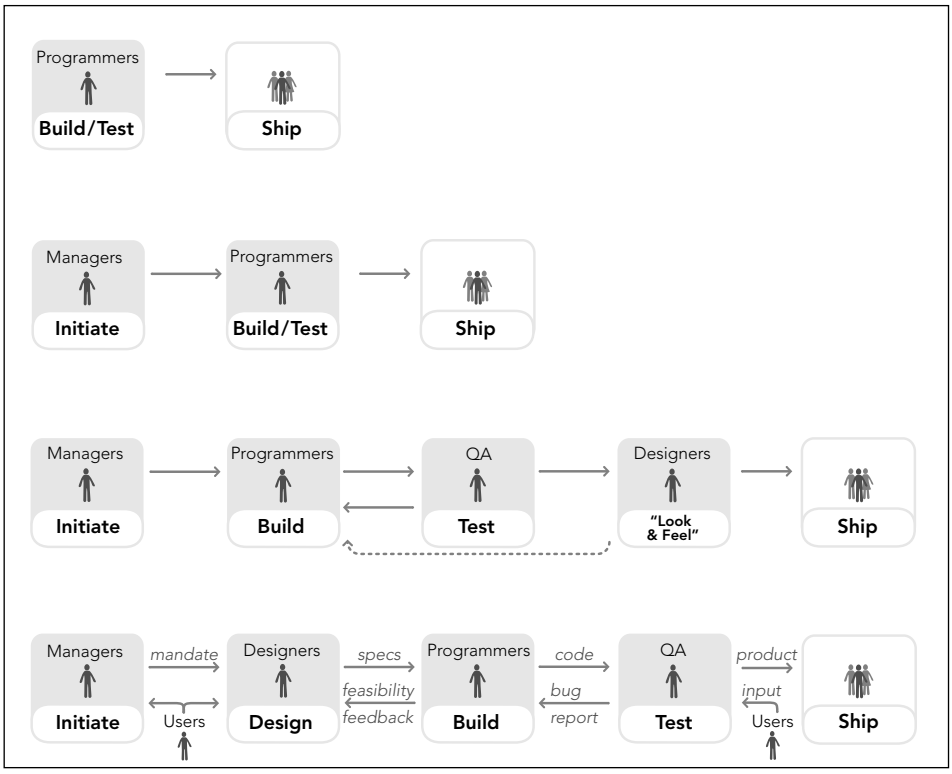

Figure 7. From top to bottom, the evolution of development process. Designing the interaction before the implementation phase is the key for usable results. (Cooper & al, 2007)

used mostly interchangeably with user-centered design, is human-centered design, defined by the ISO 13407 (1999).[7]

The ISO 13407 defines a rough framework for human-centered design (Figure 8). The first step in the model is to identify the need for UCD. The challenge often is that the organization does not understand that it has a problem with usability. Different kinds of wake up calls for usability and the changes required in the mindset are discussed in more detail in the chapter *3.3.2 Introducing usability into an organization*.

Once the need for human-centered development has been recognized, the actual process involves a loop, which consists of four stages:

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[7] There is some ambiguity in the use of the terms. Gasson (2003) among others separates them, whilst several localizations of the ISO 13407 translate the term human-centered design as 'user-centered design'. The difference lies in the view that human-centredness deals with human capabilities whereas user-centredness is more concerned about the use case and context of use.

1. Understand and specify the context of use
2. Specify the user and organizational requirements
3. Produce design solutions
4. Evaluate designs against requirements.

Ideally, this loop of designing, implementing, evaluating and analyzing is repeated iteratively until the system satisfies the specified user and organizational requirements. Often the first implementations can be crafted out of paper and the prototypes get more refined and technically sophisticated as the development moves on (Nielsen 1993, 95-98).

The ISO model of human-centered design provides an overview of the process, which can then be implemented in many ways. The early model by Gould and Lewis (1985) emphasizes three aspects: early focus on users and tasks, empirical measurement, and iterative design. Usability Professionals' Association (UPA) divides the process in four stages, namely those of analysis, design, implementation and deployment which all include various activities (UPA 2008).

Contextual design (Beyer & Holzblatt, 1998) is a profound methodology that stresses the analysis phase of the process and suggests an ethnographic, observing approach.

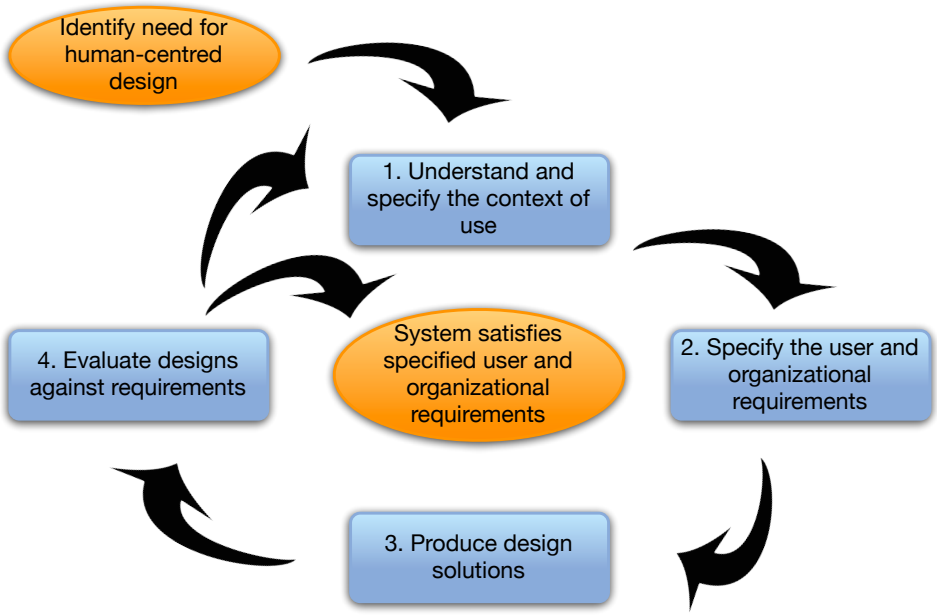

Figure 8 Human-centered design as defined by ISO 13407. (1999)

Another often cited procedure is the usability engineering life cycle model (Nielsen 1993, 72) which lists the following activities and stages:

1. Know the user
2. Competitive analysis
3. Setting usability goals
4. Parallel design
5. Participatory design
6. Coordinated design of the total interface
7. Apply guidelines and heuristic analysis
8. Prototyping
9. Empirical testing
10. Iterative design
11. Collect feedback from field use

It is often not possible to change the development process altogether. Nielsen's model leaves room for variations when integrating the activities in the current processes. Schaffer calls the integration of certain user-centered methods to an existing process *retrofitting* and provides insight into the challenges involved (Schaffer 2007, 111).

2.4.3 User testing and usability inspection

Nielsen presents some of the basic methods for usability evaluation, including *usability test* and *heuristic evaluation* (Nielsen 1993). Riihiaho (2000) divides usability evaluation into user testing and usability inspection (Figure 9) and shares experiences with different methods.[8] User testing involves users, whereas usability inspection can be conducted without them.

Rosenbaum (2000) provides further insight into which methods have been useful at various stages of development. Collecting experiences from various usability practitioners, Mao & al. (2005) report that cost–benefit tradeoffs play a major role when selecting the methods: heuristic evaluations are broadly applied although they are not considered especially effective, and more costly field studies are infrequently

[8] Focus groups are another method, widely used in market studies and often suggested as a way of discovering usability problems, too.This is generally not recommendable. For more discussion, see the chapter *3.3.1 The difference between marketing and user experience*

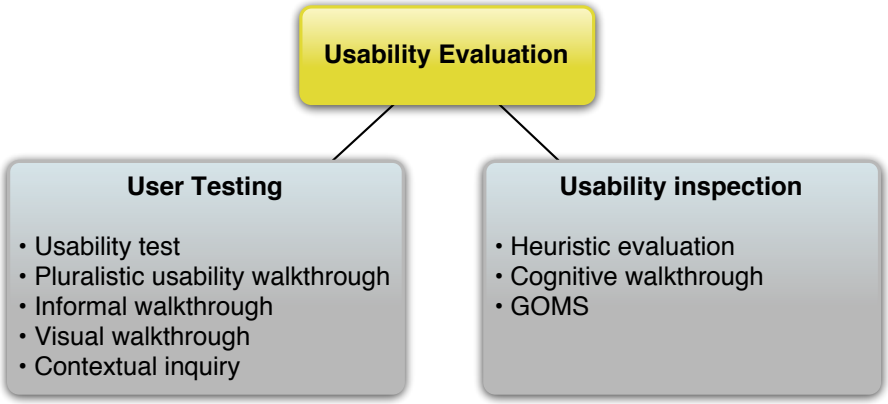

Figure 9 Usability evaluation can be divided into user testing and usability inspection. Testing requires users, while inspection can be conducted by professionals alone.

used even though they rank high on perceived practical importance. The most utilized testing method is usability test where users are observed while completing predefined tasks, usually in a specific usability laboratory (Riihiaho 2000).

Heuristic evaluation is the most common inspection method, respectively. In it usability experts go through a product and find possible usability problems with the help of a list of design fundaments, known as heuristics. (Riihiaho 2000) Heuristics are abstract rules of thumb and suggest for example that the system should minimize the amount of things that the user has to remember. Usability guidelines are more concrete design guides that many software companies have developed to maintain consistent functionality and look and feel in different applications.

Another way of storing best practices are design patterns, which try to capture working solutions to common problems in a generally applicable way (Borchers 2001). Yahoo!, for instance, has published the collection of their design patterns for the new interfaces made possible by the so-called web 2.0 technologies (Yahoo! 2008).

One thing that is common to all mentioned user-centered design procedures is that they are reactive: user research begins only after the development process is initiated and the general scope of the product has been decided. User-data typically has little role in these decisions. One part of the strategic usability is that user research does not only contribute to improving products but also to the phase of discovering new

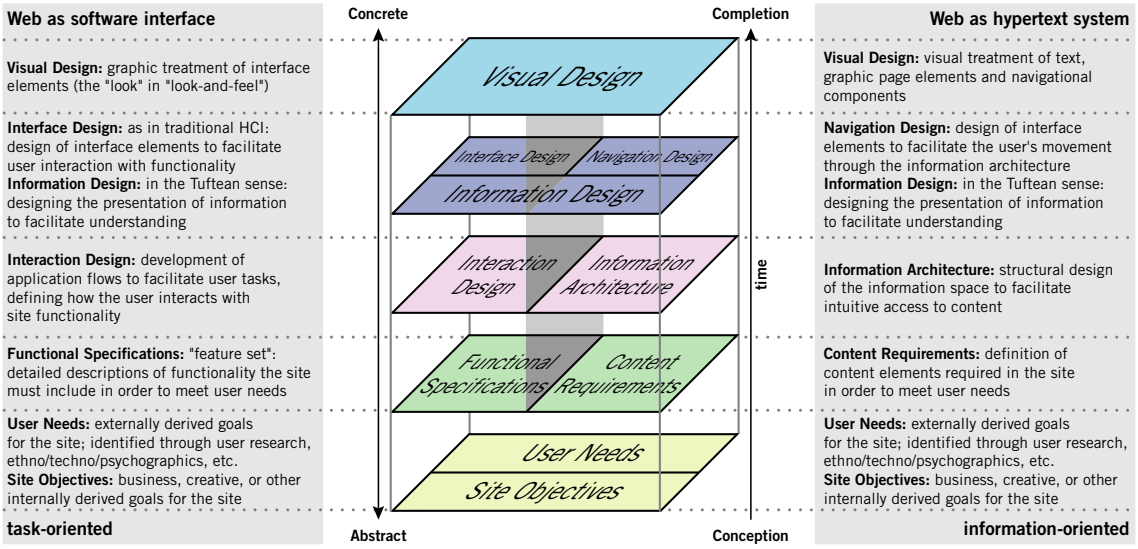

Figure 10 The hierarchy of the elements of user experience, form bottom to top: strategy plane, scope plane, structure plane, skeleton plane, visual plane. (Garrett 2000)

product opportunities. This is further discussed in next chapter, under the topic *3.4.3 Strategic usability*.

2.4.4 Reference model for web user experience

When stressing the importance of aesthetics and the visual aspect of the experience, one easily gets the wrong idea that user experience is concerned merely with making things look good. Garrett (2003) suggests a hierarchical model of user experience for web services and a procedure for achieving it. This model was found useful when designing the service described in the case study, so it is used as an example of a user-centered process and presented in detail.

The model consists of five planes, from bottom to top: the strategy plane, the scope plane, the structure plane, the skeleton plane and the surface plane (Figure 10). Each plane is dependent on the planes below, which dictates the order in which the planes are to be considered in the development process. To some extent, the dependencies also apply backwards and have a ripple effect on the underlying planes. (Garrett 2003, 22-25)

Owing to the hierarchical nature of the model, the process of considering each plane separately quickly seems to become linear and look like the waterfall model discussed earlier. That is why Garrett says that one is not supposed to think that

earlier phase has to be finished before the next one can begin. Instead, the requirement should be that the latter phase cannot finish before the earlier one has finished. This leaves room for iterative and parallel design. (Garrett 2003, 26-27)

Regarding web user experience, two different communities exist. Originally web was seen as a publishing medium consisting of static pages and links between them. As technology advanced, new possibilities emerged and web became more interactive and dynamic. Suddenly it was seen as a platform to support interaction much like traditional desktop applications. As a consequence one group of designers saw every problem as an application design problem, whereas the others saw the web in terms of information distribution and retrieval. The former group stems from the traditional desktop usability world and originally from ergonomics and human factors engineering. The latter comes from world of publishing, media, and information science. To take this division in account, Garrett divides each plane into two halves, one concerned with web as a software interface, the other seeing it as a hypertext information space. (Garrett 2003, 27-31)

There are areas that are crucial to the success of the service but are not included in the model. Garret emphasizes the role of content, as no user comes to the site just to enjoy navigation if there is nothing of value provided (Garret 2003, 35). Another aspect left outside the model is technology, which naturally has the important role of making everything possible and which often largely determines the nature of experience that can be realized in a given project. Excluding it from the model, however, guarantees that the framework by no means becomes technology-centric (Garret 2003, 36). What follows is a more detailed look at different phases: the questions that are asked, the methods that are used and the deliverables that are created.

Strategy plane is the basis of the model. This plane sums up essentially two things: what the company wants from the service and what the users want from it. The first question defines the site objectives, the second one addresses the user needs. Garret points out that while these questions are usually somehow addressed, they need to be stated explicitly to provide a solid basis for the design. Site objectives include business goals, brand identity and success metrics. The business goals should be specific enough to be supportive but not tied to specific solutions before the actual needs are clear.

Both market research and user research methods are useful at this stage. Contextual inquiry, task analysis, user testing, card sorting and personas are specifically mentioned. At the end of this stage, it is recommended to create a formal *vision document* which explicitly states both the site objectives and the user needs. (Garrett 2003, 40-58)

The scope plane is where the strategy is translated into actual requirements. On the software side a *functional specification* is created, whereas on the information space side the scope is presented in the form of *content requirements*. The two main reasons why this is done are to clarify what is being built and what is *not* being built. Sometimes it might happen that feature requirements indicate that the strategy is not optimal. Re-examining strategy is recommended in these situations but if this happens too often, it indicates that one has jumped to gathering requirements too soon. (Garrett, 2003, 63-65, 81)

Methods for collecting the functional requirements are largely the same that were utilized on the strategy plane. Garret suggests that the personas created earlier can now be used to develop scenarios. Having a look at existing services, both direct competitors and those representing analogous domains, is beneficial. The important thing to be remembered is to address the disease rather than the symptom; to understand the profound reasons behind the found problems and requests. Once the requirements have been collected, they need to be stated in a falsifiable form so that it is later possible to check if they have been met. (Garrett 2003, 69-75)

Garrett does not provide as specific a guide for documenting the content requirements but makes the point that content has to be specifically addressed. Presenting covers of books in a store might have a positive effect on the experience but it also causes many requirements, both in terms of acquiring the content and technical implementation. The content should also be carefully designed: a FAQ should contain the questions that truly are asked frequently. (Garrett 2003, 36, 76)

The structure plane defines how the various requirements are realized. The discipline involved in creating the structured experience is known as *interaction design*. Earlier, interaction design was seen as a part of interface design but the distinction underlines the fact that the interface cannot be successfully created if the underlying structure does not work. When it comes to the content side of the structure plane, the discipline involved is called *information architecture*. Simply

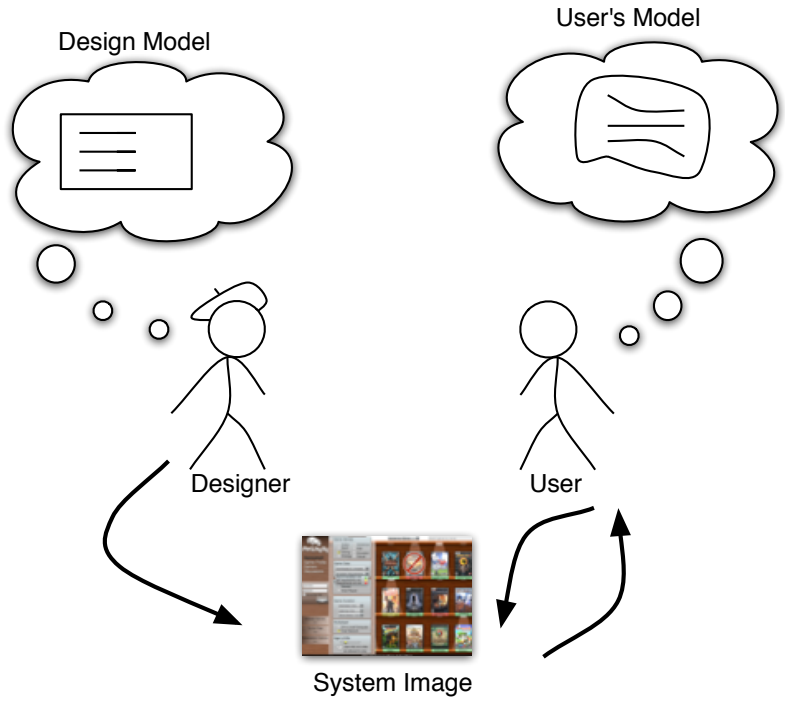

Figure 11 The user creates her mental model based on the interaction with the system. The system image consists of the embodiment of the system, including not only the interface but also instruction manuals and other auxiliary material. If the system image fails to convey the design model, the user creates a flawed model and ends up having difficulties understanding and predicting how the system operates. (Adapted from Norman 2002, 16.)

put, interaction design is concerned with the users completing tasks, while information architecture deals with conveying information to the users. (Garrett 2003, 86-87)

Interaction design deals with conceptual models: how to present the service in such a way that the user understands its logic like it is meant by the designers. The goal is to create a design that conveys the conceptual model so that users understand it intuitively without specific instructions. The better the user's model corresponds to the actual design model, the more successful she is in using the system (Norman, 2002, 16). (Figure 11)

Another important issue for interaction design is error handling. The best approach is to avoid errors altogether, the next best thing to make them difficult. Consideration is needed, though, as many well-intentioned solutions designed to prevent errors in fact

end up causing more errors or at least irritation. As a general rule, it is always better to offer the option to undo an action than to ask for confirmation. (Garrett 2003, 92)

When it comes to information architecture, two general approaches are available. The top–down approach involves creating the architecture directly based on the site objectives and user needs. Starting from the broadest categories needed to fulfill the goals, the categories get divided into subsections. The bottom–up approach, on the other hand, takes the requirements as a starting point and groups these into higher-level categories and hence builds toward a structure that will eventually meet the objectives set on the strategy plane. Regardless of the approach, there are various general structures available. The site structure can be of the type hierarchical, matrix, organic, or sequential. The utilization of metadata gives even more possibilities and allows for a more flexible structure. (Garrett 2003, 94-104)

The document to be created based on the structure plane is called *architecture diagram*. Garrett suggests the use of Visual vocabulary, a diagram model that is specifically targeted at documenting the interaction design of web sites (Garrett 2002). Traditionally, flowcharts are widely used for this kind of documentation.

The skeleton plane is the place where the level of individual pages and their components is considered. *Interface design* comes to play when designing the software interface side of the plane. On the content side the plane is about *navigation design*. These are often closely related to each other as well as to the third concept of *information design*, which reaches to both sides of the plane. Simply put, interface design is about doing things, navigation design about going to places, and information design about communicating ideas. (Garrett 2003, 114-115)

Garrett suggest following the existing conventions unless there is a good reason to break them. Indeed, interface design is a field of HCI that is particularly well covered in literature (Cooper & al. 2007; Schneiderman 2004). Similarly, he warns against using real world metaphors. While often witty and fun, they rarely work as well as they should. Specific guides given to the interface design include making the most often needed options easily available and providing good default values. Often the workload of the user can be decreased by remembering certain options automatically.

The navigation design has to meet three goals:

- It must provide users with means of getting from one place to another
- It must communicate the relationship between the elements it contains
- It must communicate the relationship between its contents and the page the user is currently viewing. (Garrett 2003, 125-126)

Most large web sites provide multiple navigation systems. Garrett divides these into global navigation, local navigation, supplementary navigation, contextual navigation, and courtesy navigation. In addition to these exists the so-called remote navigation, the ones that users resort to when all else fails. These include site maps and indexes. (Garrett 2003, 127-131)

Information design deals with presenting the information so that it can be understood more easily. Sometimes it is visual; sometimes it is about grouping pieces of information so that they make sense. A registration form could serve as an example of a situation where information presented in the wrong order can cause confusion. (Garrett 2003, 131-134)

The resulting document of this plane is a collection of *wireframes*. Wireframes can vary in the level of detail and often it is not necessarily to create a specific wireframe model for each single page on the site. The wireframes can be referenced by the people responsible for the earlier planes to confirm that the final product will meet their expectations. On the other hand, people responsible for building the site can refer to the wireframes to see how the site should work. (Garrett 2003, 135-139)

Visual design is the topmost plane of the model. As the name implies, it deals with the aesthetics and is the plane most easily observable by the users. Garrett stresses that aesthetics are not merely the question of subjective taste. It is important to consider how well the design supports the nature of the service: whether it reinforces the structure and makes the options available for the users. Communicating the brand identity, derived from the original strategy is also an important goal for the design. (Garrett 2003, 143)

The visual *mock-ups* end up looking like the final product. The designs do not necessarily exactly match the wireframes they are based on but it is important to make sure that the decisions made earlier are respected and not accidentally ignored at this stage. To cater for the internal consistency of the site, it is recommendable to create a style guide that documents every aspect of visual design of the site, from the

global layouts and typography standards to smaller details. (Garrett 2003, 156-158-25)

This concludes the overview of the hierarchical model of the elements of user experience. It boils down to two points: understanding the problem that is being solved and understanding the consequences that the proposed solution has to the problem. Often these things are not considered and services are created either by following the structure of the underlying technology, mimicking existing solutions without clear understanding whether the solutions are reasonable, or following the personal preferences of the designer. (Garrett 2003, 163-164)

Garrett makes the point that thoughtful, deliberate design decisions will cost time in the short term but they will save much more in the long term. (Garrett 2003, 169) What follows is an overview of cost-justifying usability, which seeks to find methods for estimating these savings in greater detail.

2.5 Cost-justifying Usability

Usability as a profession has matured but it still often needs to struggle to justify its existence in companies, much like marketing and quality control before it (Norman 1998, 208). Experience has shown that support from upper management is a necessary requirement for usability department to flourish. This is why usability community has since the late 80's (Mantei & Teorey 1988) attempted to communicate its benefits in the language of economics and provide estimates about the return on investment (ROI) for usability activities.

2.5.1 Return on investment for usability work

Various formulas that exist for estimating the ROI are concerned with calculating the savings that are caused by the faster operation of the system, as a result of a usability-oriented redesign. For instance, Sorflaten (2006) demonstrates how one can calculate the ROI for a redesign of an application, used by customer service representatives while answering the incoming calls from the customers. Assuming that after the redesign each call can be handled 20 seconds faster than before, one ends up having a ROI of 722 percent. Another much researched domain for usability ROI is e-commerce where metrics like conversion rate and amount of abandoned shopping carts are used (Nielsen 2008).

Comparing a new version to an older one is straightforward and gives reliable results but provides little help when valuing usability in new service development. What is more, most of the formulas assume that the time the user operates the system has a value that can be directly measured in money. This is the case for corporate intranets and e-commerce web sites but when consumer products and services are concerned, the value of customer satisfaction – or the lack thereof – is harder to measure. (Nielsen 2003; Nielsen 1993, 83).

Still, it can be argued that in consumer products the role of usability is even more important because the user and the customer who makes the decision to buy the product are often the same person. Business users are compelled to use the systems that their company has decided to purchase, often paying attention to aspects like scalability and total cost of ownership but not so much to the actual usability (Norman 1998, 45). When the users are free to select the product, they might as well pick the one they enjoy using the most.

This is one reason behind the trend of *consumerization*, the employees utilizing consumer products such as Google applications or Skype in their work instead of business-oriented alternatives. The consumer products that are designed for decreasing product life cycles provide value to the users by having better usability, availability and reliability than their business counterparts. (Gartner 2005)

Incorporating usability into development brings benefits for both, the vendor and the customer. Table 1 lists some of the benefits (Rohn 2005, 200-207). ISO 13407 (1999), which defines the human-centered design process, mentions the following economic and social benefits for making the systems more human-centered:

- They are easier to understand and use, thus reducing training and support costs.
- They improve user satisfaction and reduce discomfort and stress.
- They improve users' productivity and the operational efficiency of organizations.
- They improve product quality, appeal to the users and can provide a competitive advantage.

Table 1 The benefits that human-centered development brings to the vendor and the customer. (Rohn 2005)

Benefits to the Vendor Company	Benefits to the Vendor Company and Customers
Increased Sales	Decreased Costs
Increased Customer Satisfaction and Loyalty	Increased Productivity
Increased Customer References	Decreased Training
Increased Favorable Reviews	Decreased Errors
	Decreased Support
	Decreased Development Costs
	Decreased Installation, Configuration, and Deployment Costs
	Decreased Maintenance

As can be seen from the lists, usability engineering has its effects on various areas but quantifying its role and differentiating it from other affecting factors is often not possible. A widely accepted rule is, however, that the earlier the problems are found, the cheaper it is to fix them. This further implies involving usability engineering as early as possible during product development, for it provides means of finding the problems even before implementing the product.

An often quoted figure is that a change may cost 1 unit of project resource during design, 6.5 units just before testing begins, 15 units during systems testing and 60-100 units after release (Pressman 1992, 203). Gilb similarly says that if the cost of making design changes was 1 unit during the user-centered design phase, the same thing would cost 10 times as much during the development phase, and up to 100 times as much after product release (1988, 349).

Based on analysis of various web services, Nielsen (2003) has concluded that the best practice is to devote 10% of projects budget to usability engineering. This ends

up doubling the usability, measured by criteria relevant to a typical commercial web site (Table 2).

Table 2 The effect that devoting 10% of the project budget to usability has on metrics relevant to commercial web sites. (Nielsen 2003)

Metric	Average Improvement
Across web projects sales / conversion rate	100%
Traffic / visitor count	150%
User performance / productivity	161%
Use of specific (target) features	202%

In a follow-up study (Nielsen 2008) it was found out that since 2003 the average improvement gained by a redesign has decreased from 135% to 83%. This is explained by the fact that much has been done already and the average quality of web sites has increased. In the same time, users have also gained experience. As the easy improvements are done already, more drastic actions should be taken to further improve the situation. However, usability budgets have remained at the same level of 10%, preventing this from happening.

Nielsen sees the formula for web site success to be

$$B = V \times C \times L$$

where

B = amount of business done by the site
V = unique visitors coming to the site
C = conversion rate (the percentage of visitors who become customers)
L = loyalty rate (the degree to which customers return to conduct repeat business)

According to Nielsen the component that should be improved next is the loyalty rate. The amount of unique visitors is largely dependent on marketing and cannot usually

be cost-effectively increased, as doubling the number of visitors means more than doubling the advertising budget.

Usability engineering has been able to increase conversion rates, doubling them from the average of 1% back in 2000 to 2% of today. Further improvements are possible and certainly still more viable than focusing on marketing. Nielsen sees that doubling the conversion rate should require under 15% of the budget devoted to usability engineering. Currently most successful sites see conversion rates of 4% and Nielsen considers that even doubling this might be possible before the point is reached where usability investment does not pay off anymore. (Nielsen 2008)

Loyalty, however, has not yet received that much attention and this is where the biggest potential is seen to be. Where conversion rate has much to do with the usability of the site, in a sense how the tasks can be completed, loyalty is a more profound concept and requires deeper knowledge of the users. Garrett also points out that user experience has a greater effect on customer loyalty than features and functions (2003, 14). Nielsen goes on to estimate that if 2000-2010 is the decade of conversion, 2010-2020 will be the decade of loyalty.

2.5.2 Usability ROI critique

Usability ROI theories have also received their share of critique. Rosenberg (2004) goes through some of the basic arguments of usability ROI calling them myths. He points out that despite the large number of articles written on the theme, there are only about a dozen case studies with the detailed enough financial data. This is greatly due to the sensitive nature of the information. It is the same handful of articles which get referred to time and again and even though the field of usability engineering as a whole has advanced since the beginning of the 90's, there is a notable lack of more recent material concerning ROI.

Another point is that of *voodoo economics*. Rosenberg accuses usability practitioners of trying to disguise usability in mathematical form, hoping to trick the executives into believing in it[9]. He also asks whether the decision makers really are that

[9] As an example he asks one to think of a situation where half of the world's billion Internet users are able to access a web store but 80% leave without buying anything. Assuming that the average cost of an abandoned shopping cart is $20, one will lose 8 billion a year in sales. A $500 heuristic evaluation might improve the situation by 50%, resulting in a ROI of 80,000,000 percent.

impressed by the calculations that they do not weigh usability investments against other possible investments. The same point is made by Rhodes (2002) who accuses ROI practitioners of ignoring the *opportunity cost*. The money invested in usability is away from somewhere else and this should also be taken into account in calculations.

Rosenberg concludes by noticing that saving costs, which is the main argument of the ROI calculations, is generally considered a tactical endeavor, whereas making money is a strategic one. Instead of trying to show simplified examples he suggests an introduction of *customer total cost of ownership,* which should provide a more realistic model for estimating the impact of usability work. (Rosenberg 2004)

All in all, the promises of usability work – a product that sells more and requires less maintenance – are becoming more widely accepted. Managers already understand that usability is a must-have characteristic of a product or service, but they often do not see what it takes to deliver it. ROI calculations are no magic cure for confirming executives and getting them committed to usability, however. (Dray & al., 2005)

A better way is to start small and show success along the way: provide example cases where products and services have succeeded thanks to systematic usability engineering. (Schaffer 2007, 18) Another point is to transcend the tactical savings-oriented view on usability and better define its role in creating profit. (Dray & al., 2005) The next chapter takes a broader look at business justifications of usability and shows why it is a critical success factor of a product.

3 User experience as a success factor

This chapter connects user-centered development of products and services to a broader context. Usability work is seen to have two roles: First, taking care of usability ensures that technical product[10] innovations are able to spread even among the customers who are not inclined to technology. This involves seeing usability as an element of overall quality of the product. Second, assuming that quality has become a commodity and usability as a component of overall product quality is not enough to differentiate the product from the competition, the question is whether usability engineering can also contribute to the innovation process and help discover new markets and product opportunities earlier gone untapped.

At first the theory of the diffusion of innovations is presented and the role of usability in bridging the gap between early adopters and the late majority of users is discussed. This is linked to a chair model where the success of a given product is seen to depend on three legs: technology, marketing and user experience – the latter of which becomes crucial when trying to break into the late majority of users.

To further extend the model, the lead-user theory is visited. This theory suggests that there exist users who develop their own solutions before such solutions even become commercially available and are hence situated even before the early adopters in the life cycle of technology adaptation.

Incorporating lead-users into the development process is related to new ideas of more strategic approach to usability work where users are observed even before the initial project decisions have been made. The profound knowledge about users gained by these methods is suggested as a solution against the so-called *innovator's dilemma* where disruptive technologies cause radical changes in the market place.

Finally, end-user based innovation suggested by strategic usability is linked to other related ideas, including open innovation and blue ocean strategies. It is also noted

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[10] In this chapter products and services are not specifically distinguished but the term *product* can refer to both

that various recent attempts to better define the innovation process utilize user observation as tool at the early phase of the so called fuzzy front end.

3.1 Innovation as the new mandate

There are few companies that do not talk about the importance of innovation nowadays. Hamel & Prahalad (1994) noticed already in the 90's that where quality used to be the way to differentiate from the competitors, the next source of competitive advantage would be to be able to create fundamentally new products and businesses. Nowadays many consider that quality has become a commodity and innovation is the strategic weapon that drives profit and provides corporations the means to differentiate from the competition (Brown 2008; Dubberly 2008; Vogel & al. 2005). It has been argued that we have reached a point in the evolution of technology where innovations have replaced inventions as the most important driving force of the economy (Vogel & al. 2005, 23).

The word innovation is often used loosely. Dubberly (2008) provides a compact definition by stating that innovation is a process in which insight inspires change and creates value. In this chapter innovation is understood along the lines of Vogel & al. (2005, 24): Innovation extends beyond invention of new technology and includes a thoughtful and insightful application, delivery, extension, or recombination of existing technology. It might involve a technological invention but it may be technologically incremental as well. Important is that an innovation is a valuable leap from the viewpoint of the user, whether or not the producer sees it to be merely incremental.

3.2 The diffusion of innovations

When developing high tech products and services to the large majority of people, the rate at which the potential customers are ready to accept technological innovations becomes interesting. The research on the spread of innovations has a long history. It was already in 1957 when technology adaptation was studied in the agricultural context (Bohlen & al. 1957).

3.2.1. Rogers presents the five archetypes

In 1962 Everet Rogers published his seminal book *Diffusion of Innovations* where the diffusion of innovations is defined as the *process where the innovations are communicated among the members of social system through particular channels over time* (Rogers 1995, 5). He presents the still widely used five archetypes of people, varying in their tendency to accept new ideas.

- innovators (2,5%): venturesome
- early adopters (13,5 %): respectable
- early majority (34%): deliberate
- late majority (34%): sceptical
- laggards (16%): traditional

According to Rogers, innovations are always adopted in the same order: innovators first, then the early adopters, followed by the other groups. Should the innovators never adopt the idea, it hardly ever becomes widespread. (Rogers 1995, 263-265) Each potential user considers five characteristics before accepting a new innovation, product or idea. These are: relative advantage, compatibility, complexity, trialability, and observability.

In order to succeed, the innovation needs to provide enough advantage compared to the current situation, be compatible enough, and not too complex. It is also important that it can be tried before making the decision of adaptation and that once it has been adapted, this is observable to others. (Rogers 1995, 36) Kalliokulju and Palviainen (2006) remark that many of these forces can be affected by the methods of user-centered design and hence the rate of adoption can be accelerated.

When the diffusion of innovation is presented cumulatively, the amount of individuals who have adopted the innovation follows an S-shaped curve. This happens because at first there is a risk for the user to adopt the innovation. After a certain critical mass has been achieved, the risk is in turn involved in not adopting the innovation. Kalliokulju and Palviainen (2006) connect this with the theory of tipping point, defined as “the moment of critical mass, the threshold, the boiling point” by Malcom Gladwell (2000, 12).

The model is widely accepted but has also received its share of criticism. Rogers (1995, 100) warns himself that the model is pro-innovation biased, meaning that it is

assumed that innovations should always spread. This hinders the analysis on the reasons why certain innovations have not spread and also how the diffusion of negative innovations such as drugs could be prevented. The theory is also said to lack explanatory power and the ability to predict outcomes and provide suggestions for accelerating the rate of adoption (Clarke 1998).

Another reason why the actual adaptation of the innovation can significantly differ from the theoretical S-curve is the type of the innovation. Should it be discontinuous by nature, meaning that it forces the user to fundamentally change her behavior, the adoption can be much slower (Kalliokulju & Palviainen, 2006). Another external reason that can alter the rate of adoption is the dependence on an earlier chosen technology. One example of this is the QWERTY layout of keyboards which is not the fastest nor the easiest to learn but is so widespread that the change to a more efficient layout is not viable with the current technology (Rogers 1996, 8-10).

3.2.2 Moore and the chasm

Geoffrey Moore has extended the original diffusion model by stating that there is a gaping chasm between the two first technophile groups and the rational majority (2004). This is specifically the case when the innovation is of discontinuous type. According to Moore, the marketing strategies that a company needs to follow before the chasm are radically different from those that are suitable after it. He goes on to say that it has been the destiny of many a promising technology-driven company to fall in the chasm and never reach the majority (Figure 12). (Moore 2004, 19-21)

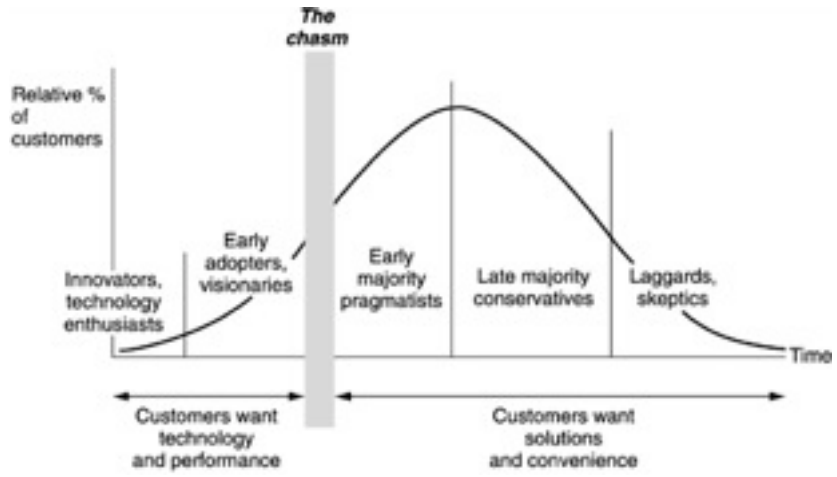

Figure 12 According to Moore there is a chasm between the two first technologically oriented groups and the large majority. (Norman 1998)

Moore's notion of the chasm is highly analogous to that of Cooper, who divides people into *apogolists* and *survivors*, based on their attitude towards technology. Apologists are interested in technology itself and are ready to come up with excuses when technology fails them. Survivors, on the other hand, are the ones who only wish to get their jobs done and feel themselves victimized by the failing technology. (Cooper 1999, 61-65)

Moore's strategy for crossing the chasm involves capturing a niche market among the early pragmatists on the other side of the chasm by focusing on solving one specific problem exceptionally well. Once this position is secured and providing that the niche market is carefully selected, one can increase one's foothold by capturing adjacent markets from analogous domains.

Despite its thin scientific basis, Moore's model has been widely approved and might even be better known than the original model by Rogers (Kalliokulju & Parviainen, 2006). It is worth noticing that due to the underlying business-to-business approach, some of the Moore's suggestions are not directly applicable to consumer products. What is more, it has been stressed that the chasm model should only be applied to situations where the innovation in question is truly discontinuous, meaning that it forces the user to change her behavior. If the innovation is continuous by nature, the original, Rogers' model is considered more appropriate. (High Tech Strategies, 2007)

Moore never mentions usability per se but presents many ideas that are familiar to it. For example, the level of detail that he suggests to be utilized when defining the target customers, exceeds that of traditionally used in marketing and resembles the personas utilized on the field of usability engineering (Moore 2004, 126; Cooper 1999, 175-181). Moore points out that while the technophile early adopter might actually enjoy compiling one's own service from various components, a pragmatic user values simplicity and wants to get a total solution, *whole product* as he calls it. Developing these whole products often requires co-operation with other companies and a holistic overview, hinting towards the field of service design. (Moore 2004, 104-110)

Indeed, Moore acknowledges that packaging the whole product is more profound than just making sure that it looks pretty. Traditionally this packaging has been the role of the marketing department but when complicated high tech products are concerned, Moore argues that the competence of the marketing team is hardly

enough to take care of this alone. He sees that it is neither only about market research, nor just technical development but something that involves cooperation of parties that have traditionally not worked together. (Moore 2004, 254)

3.2.3 From market-centric to human-centric

Based on what was earlier said about usability engineering, one can see how it seeks to be the missing link between marketing and engineering. This is exactly what Donald Norman suggests in his attempt to expand Moore's model, based on his experience at Apple and HP (Norman 1998, 23-49). Where Moore says that in order to survive in the mass market, a company has to stray away from being product-centric to being market-centric, Norman suggests that the journey does not end there: the next step is to become human-centric. What he says is that it is not enough to change the marketing, for the entire product must change (Norman 1998, 274).

Norman sees the evolution of a technology-driven company constitute of three stages. In the beginning it is all about technology. The products are designed by technologists and only a small marketing and sales group is required to get the product to the hands of the customers, representing the visionaries in Rogers' terms. (Norman 1998, 36).

As the technology matures, the pragmatic early adopter customers enter the market with their greater demands. They not only want to be proven that the product is worth the investment but also have a set of market requirements they want to be fulfilled. As a result, a dedicated marketing unit is formed with a task of convincing the customers about the capability of the product and bringing back customer's feature requirements to the engineering team. This is the moment when technology-driven phase transitions to feature-driven phase but the chasm remains to be crossed. (Norman 1998, 37)

Marketing gains ground and establishes itself as equal to engineering in influence. Soon marketing is represented on every technology team, which often leads to tension between the two groups. The feature lists that marketing gathers from the customers drive the development of new products. The engineering department might find these requirements outrageous and marketing in turn feel that the engineers are incapable of understanding the needs of the customers. (Norman 1998, 37)

According to Norman it is at this time – when the market starts to mature and the chasm should be crossed – when the need for human-centric development becomes evident. In the mature market the technology is good enough and loses its role as a selling point. Aspects like style, ease of use, reliability, and convenience replace it. Norman provides wristwatch as an example of a product where technology has long ago lost its meaning – nobody cares for extra precision – and other qualities drive the market (Norman 1998, 29).

At this point the price also becomes more relevant and as manufacturing the product is possible for a larger number of companies, the market quickly becomes more competitive. The study conducted by Agarwal and Bayus (2002) shows, however, that price is not the driving factor when it comes to adoption of a certain technology. The significance of the amount of the companies operating in the market is much greater.

This is seen to indicate that the reason the pragmatic majority does not buy the products is not that they are too expensive but that the products are not considered mature yet (Kalliokulju & Parviainen, 2006). This is in line with the buying hierarchy model, suggested by Windermere Associates (Christensen 2007, 221). According to the model the order in which different aspects of a product are relevant is functionality, reliability, convenience and price.

3.2.4 Feature dilemma

Norman argues that the difference between the mindset of the feature-oriented early adopter and the solution-oriented pragmatic user is how they see the value of features. The exactly same features that were collected by the customer-centric marketing department in the feature-driven frenzy of the early adopter phase, can add up to the confusion, experienced by the late majority of users. Cooper among others points out that the idea that adding features to an abstract product is free as it does not consume physical resources is flawed. Every single feature makes the product as a whole more complicated to operate and understand. (Cooper 1999, 59-61)

Examples of the phenomenon abound, and usability practitioners have known the problem for a long time[11] but the reality has been that people tend to buy new

[11] Norman (2002, 172-174, orig. 1988) calls the phenomenon *creeping featurism*. Other terms used include *feature fatigue, feature bloat* and *featuritis* (Rust & al., 2006)

products based on their list of features, even though they would never end up using them (Norman 2007). The issue has been noticed in the business world as well: Rust & al. have studied the paradox (2006) and found out that even though people tend to prefer the product with many functions at the point of purchase, they later dislike the products they consider too complicated.

This has three kinds of consequences. First, many of the users end up returning the product. According to the study, about a tenth of the consumers surveyed had returned a home networking product, while in only 15 percent of the cases the product was actually defect. Most of the returns happened because the user could not get the device to work. The second consequence is that dissatisfied customers usually try another brand next time. Finally, dissatisfied consumers are the ones most eager to spread the word about their bad experience. (Rust & al., 2006)

There exist a need for compromises but the general trend seems to be toward favoring simplicity. In 2004 Mercedes-Benz, for instance, ended up removing 600 functions from their cars that according to the company were of the type that "no one really needed and no one knew how to use". A feature that lets one store one's preferred driving position in the power key seems like a great idea at first but eventually ends up being more annoying than comfortable. (Rust & al., 2006)

Rust & al. see that gaining this kind of deeper awareness of the customer impact would be helpful when fighting the feature bloat. Beyond this, they give companies four guidelines.

> **Consider long-term customer equity** and not just customers' initial choices.
>
> **Build simpler products**. The results suggest that managers should consider offering a wider assortment of simpler products instead of all-purpose, feature-rich products.
>
> **Give consumers decision aids**. Focusing on the essential involves creating a larger number of products that do one thing well. Decision aids are needed to make it easier to find the right product for one’s needs
>
> **Use prototypes and product-in-use research**. One way or another, managers must correct for the misleading information that many market-research techniques deliver.

3.3 User experience along technology and marketing

The idea that the development of consumer products needs to be human-centric involves understanding that user experience is one of the key factors that determines the success of the product. Norman has suggested a model where the product is seen as a chair with three legs: technology, marketing and user experience. In the early stages of the technology life cycle, it is natural that the technology leg is the strongest one but in order to succeed in the consumer market, the chair has to be balanced (Figure 13). (Norman 1998, 40)

One company with the history of utilizing the model is Apple. Turner (2007) reports that already in the 90's each product idea needed to go through evaluations in all three categories in order to be approved and the progress in each category was supervised as the project went forward. Generally speaking, this is still often not the case in most companies. Rohn (2007) remarks that UX usually does not report to the same organizational level than marketing and development, even though the companies like to say that user experience is of utmost importance to them.

The chair model is not the only one combining these three components. Larry Keeley has suggested[12] (Cooper & al. 2007, 11) that the success of a product depends on its

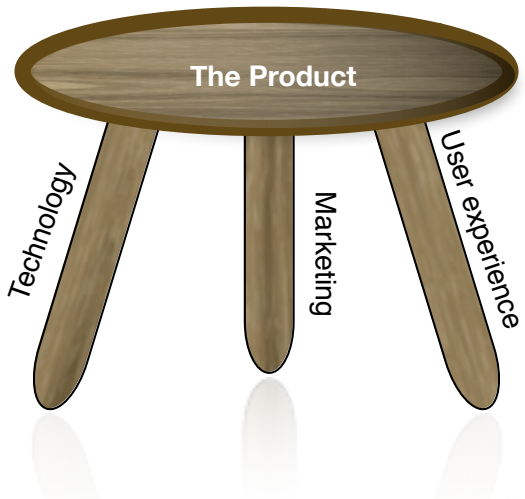

Figure 13 The chair model suggests that the success of a product depends on three equally strong legs, namely technology, marketing, and user experience. (Norman 1998)

[12] The model presented by Cooper is based on a presentation that Keeley gave in the late 90's (Cooper 2008, email correspondence, 17 April)

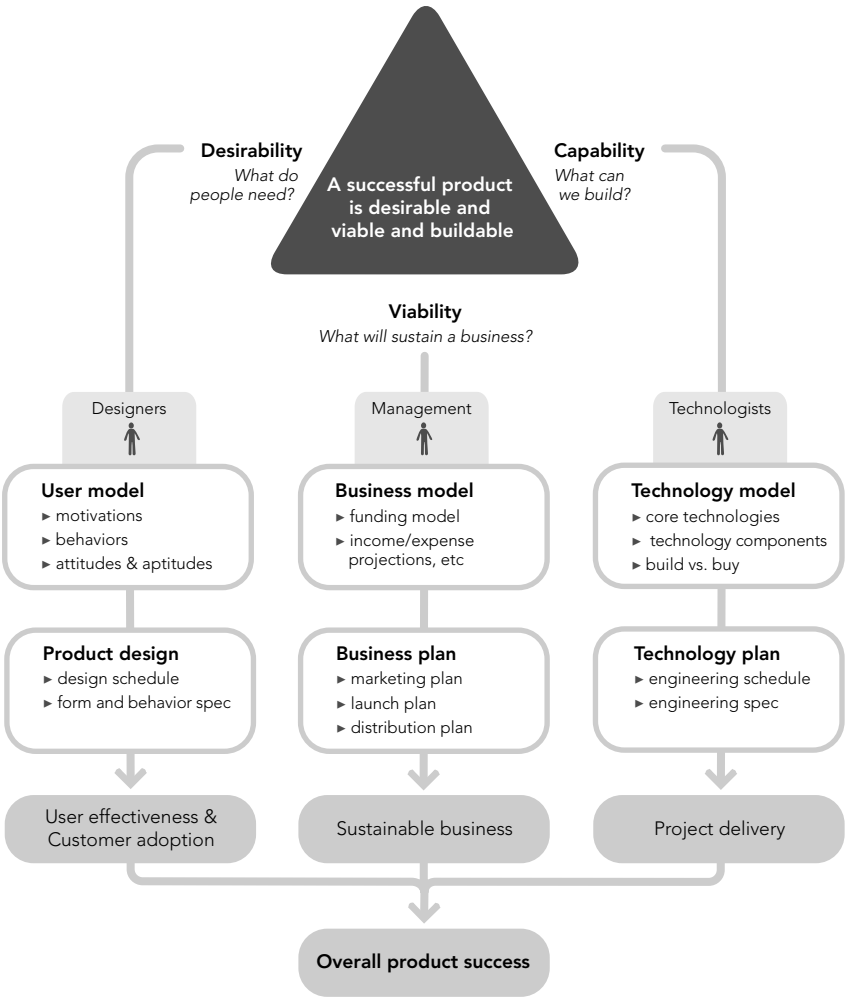

Figure 14 According to Larry Keeley, the success of a product depends on its desirability, viability and capability. (Cooper & al, 2007)

capability, *viability* and *desirability*. Here capability is understood as what can be built, viability as what will sustain a business and desirability as what people want (Figure 14).

None of the legs is enough alone. Norman provides Xerox Star as an example of a product that had superior user experience but lacked in the categories of technology and marketing and hence failed (Norman 1998, 41-42). Cooper sees Novell as en example of a company that has emphasized technology above the other legs and hence suffered as the technology matured. User experience, on the other hand, is given as the reason, why Apple managed to survive in the nineties when its technology was often inferior and market position paralyzed by the compatibility issues. Finally, Microsoft is not renowned for its desirability or technological superiority but thanks to its excellent sense of marketing it has been able to succeed. (Cooper 1999, 111-114)

3.3.1 The difference between marketing and user experience

The role of technology in a product is clear: it makes things possible. The relationship between marketing and user-experience is more complicated. Many a company already considers itself customer-centric without ever hearing about such thing as user experience. If asking customers what they want and then realizing this is not customer-centric, then what is?

One common problem is that the customers who give the requirements are executives or members of marketing or sales staff. The real users are not studied and fully understood. (Schaffer 2007, 3). Even if the feature requests come from the actual users, the designing based on feature lists is designing for tasks and does not take into account the actual goals the users wish to accomplish (Cooper 1999, 194). Cooper compares a feature list to a list of ingredients in a recipe. If one hopes to get a cake, it is hardly enough to throw the ingredients together.

The features people suggest as solutions to the their needs are also often not optimal. Generally, people are not aware of the possibilities and tend to suggest incremental improvements restricted by their experience (Von Hippel 1986, 102). Hence it is more important to understand the underlying needs than to implement the suggested solution right away. Otherwise there is a risk that the result is the design of features that are not needed by the majority of users and do not fit to the product as a whole. (Schaffer 2007, 3)

These are the reasons why one should be careful when utilizing focus groups as a method of finding out what the customers want. The participants are often eager to suggest exact features and solutions to issues they have encountered or believe that they could encounter. While these can be valuable, it is often more important to understand the actual phenomenon behind these issues. Despite the shortcomings, focus groups are a widely used method on the field of usability engineering, too, and provide useful results when applied carefully (Rosenbaum 2000).

Traditionally marketing department has been the only one to be in contact with the customers but understanding usability problems at this level is not their core competence. Schaffer sees the relationship between the parties so that marketing group defines the target, and the usability group hits it (2007, 175). Norman goes on to elaborate on the roles of these parties.

According to him, marketing understands the "pulse of the customer" and answers the questions of who the users are, what they buy and how much they are ready to pay. Another responsibilities of the marketing include presenting the product and positioning it to the market – all of these critical to the success of the product. (Norman 1998, 45-47)

Where marketing is concerned whether the customer will buy the product, user experience group deals with the actual usage: how the product is perceived, learned, and used. It includes the ease of use and, more fundamentally, the needs that the product fulfills. The emphasis is on the various phases along the life cycle of the product: "from taking it home, unwrapping, assembling, and initial learning, through continued daily use to maintenance, service and upgrading were required." (Norman 1998, 47-48) Certainly, disposing is something to be added to the list nowadays.

Marketing is the party mostly concerned about the point of sale but user experience also has its effect, primarily through appearance and the brand reputation for ease of use and quality (Norman 1998, 48). As the features largely drive the decisions (Rust & al., 2006), more attention is being paid to providing an idea of the experience even before the purchase. For instance, one of the reasons for Apple to invest in its Apple Store retail chain was to guarantee that people get to experience the product properly before buying it (Allen 2008). This comes back to Rogers and trialability as a technology acceptance factor (Rogers 1995, 36).

3.3.2 Introducing usability into an organization

Though all of the three parties have the common goal of producing a product that is as good as possible, there is no way to avoid conflicts. Providing a great experience often sets additional requirements for the technology. Sometimes the experience needs to be compromised in order to fit in the requirements of the marketing. The question arises: who makes the decisions of the tradeoffs?

In a company where user experience is taken seriously, it is understood that such a decision are about business, not design (Norman 1998, 220). Hence it is the senior managers who are supposed to best understand the consequences and be able to make the optimal compromises. According to Schaffer (2007, 37-40), user experience cannot become a relevant factor in product decisions without the support

from the top management. He stresses the role of the *executive champion* who advocates the importance of the matter throughout the organization.

At IBM (Vredenburg, 2003) a process called user engineering (UE)[13] has provided good results in combining the business and usability goals. User engineering differs from UCD in that it is not merely user driven but rather business value driven. The user engineering process starts by collecting detailed market requirements, business requirements, and user requirements and creates a business model that integrates all of these requirements, very analogously to the chair model presented earlier.

Respectively, Herman reports how business cases for user experience projects are created at eBay (2004). The process is based on a thorough ROI analysis, which is well suitable for the projects that often aim to improve current solutions.

Norman (1998, 221-222) lists the following corporate requirements for human-centered development:

- Total corporate commitment, from lowest level worker to highest level manager
- Organizational changes, so designers and the eventual users of the product interact
- A formal, human-centered product process
- An engineering discipline of human-centered development

For this kind of change to happen, the company needs to be convinced of the benefits involved. It is common that the introduction of usability practices get challenged by the existing attitude of the company. Schaffer sees that it is necessary to change the feature mindset and technology mindset (2007, 2-4). Rohn sees that the company can be customer-focused, technology-focused, executive-focused, or data-driven. Each of these provide different environments and challenges for usability work. (2005, 187-189)

The best practice recommended in literature is to start small and show continuous results. Schaffer provides insight into institutionalizing usability: educating staff, creating a process with tools and templates for deliverables and putting these into use

[13] The term ‘user engineering’ does not seem to be established outside IBM and can have other meanings, too. It is also worth noticing that the abbreviation UE is often used in the meanings of ‘usability engineering’ and ‘user experience’

in a well-documented showcase project (Schaffer 2007). Mayhew (1999) divides the process of introducing usability work into organization into three stages: promotion, implementation and institutionalization.

At the *promotion stage* it is important to create the sense of urgency. Managers do not often understand that bad usability is the reason why products do not succeed as well as hoped. Schaffer (2007) and Mayhew (1999) list various wake-up calls that can be helpful when opening people's eyes. *Train wrecks* are the most expensive type of wake-up call: the feature rich products that end up doing miserably in the market due their impracticality. *Expert reviews and usability tests*, usually conducted by external consultants to add up to credibility, are a more painless way of getting a realistic image of the situation. *Market demand* is increasingly important driver as people are getting used to better usability and take it for granted.

The *implementation stage* involves issues like staffing and organizing the function. Clarifying the roles of the practitioners and providing clear career paths is also important. At this stage the focus is in individual projects and it is useful to publicize the success that has been achieved. The *institutionalization stage* is where the scope changes from affecting individual products to integrating the approach as a part of corporate-wide processes. Mayhew points out that usability work often gets stuck at the implementation level and never reaches that of institutionalization. This way its importance is not understood at the management level and as a result usability activities are one of the first victims of corporate downsizing operations. (Mayhew, 1999)

3.3.3 Organizing usability

There are various views about the optimal organizational home of the usability activity. Some typical options include development and marketing but also quality control and documentation (Norman 1998, 222-223; Rosenberg 2007). Schaffer (2007, 171-178) provides insight into advantages and disadvantages of the various options and ends up suggesting the usability department be positioned under a specific chief user experience officer (CXO). Norman (1998, 224) remarks that while it is important that usability issues are understood at the executive level, there is a risk of alienating it from the actual development work if the reporting happens at too high a level.

One question is whether there should be one central group for usability function or if it should be distributed by project. No definitive best practice seems to exist. Central group has its virtues of collecting knowledge in one unit and providing professional support for the practitioners. (Norman 1998, 223) What is more, solutions can be shared and physical resources utilized more efficiently (Rohn, 200). The disadvantage is that this way the usability experts might become separated from the rest of the organization, which could in the worst place lead to them earning a reputation of non-cooperative design polices.

The decentralized structure where usability staff is allocated to specific projects has the advantage that the practitioners truly become members of the design groups. The problem is that without the central group to provide the set of methodology, standards, facilities, and consulting support, the structure often fails in the long run (Schaffer 2007, 168). In bigger companies with multiple lines of business, matrix organization is another alternative that seeks to combine the best parts of both models (Figure 15) (Norman 1998, 223; Rohn 2007).

Whichever the case, it is highly recommended that there is some party who is in charge of usability in the company. This way there is always someone who can be

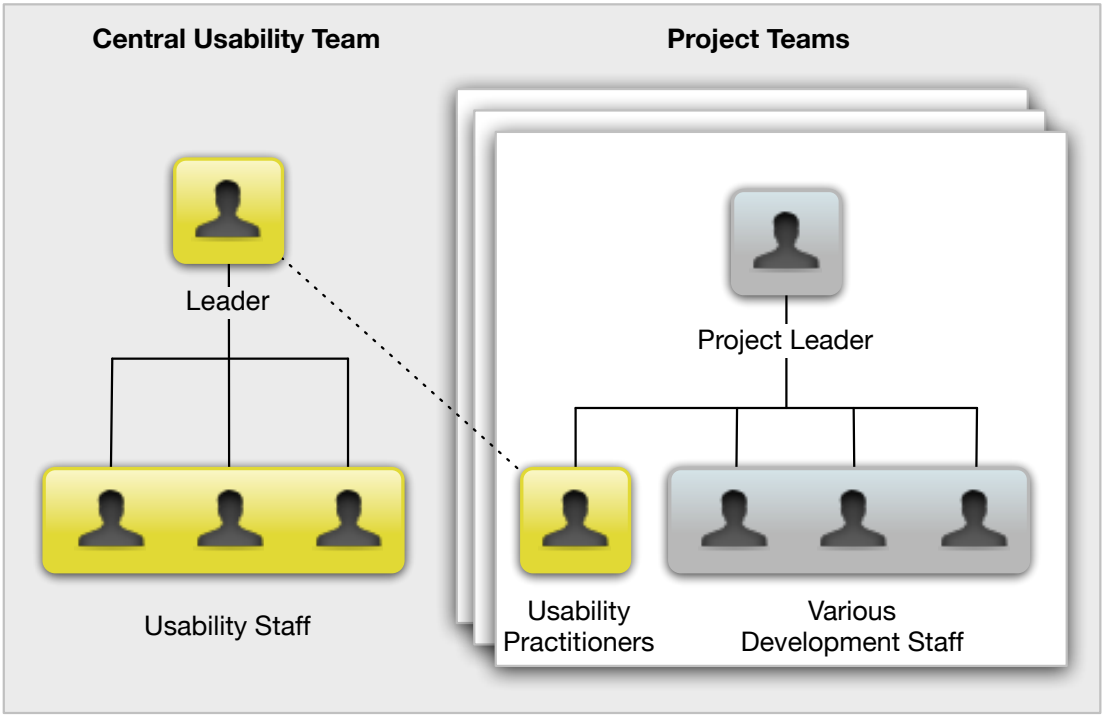

Figure 15 Matrix organization for usability function. The central usability team reports further to the executive champion. (Schaffer 2007, 169)

asked for guidance when a certain project manager needs help in usability issues. Collecting the backlog in one place provides means for utilizing the past experience and saving time. Developing the methodology and educating the personnel also take up resources. Even if some of the usability activities were decided to be bought from an external consultancy, it is beneficial that there is someone who can help in the process and knows what is needed in each situation. (Schaffer 2007, 225-243)

3.4 User-research-driven innovation

It has been seen how paying attention to usability helps discontinuous innovations to spread. Another issue is how disruptive technologies provide discontinuities that companies can exploit to stray away from the competition and find new markets. In his seminal work *Innovator's Dilemma* Christensen (2001) presents a theory based on an extensive study on hard-drive industry. The main discovery is that established companies tend to fail to react to emerging disruptive technologies and lose their market position to newcomers. The dilemma is that these companies lose even though they seem to do nothing wrong when observed by the traditional management criteria.

3.4.1 Disruptive technologies

Christensen introduces the concepts of *disruptive technology* and *sustaining technology* and stresses that the innovation caused by a disruptive technology is different from the established concept of *radical innovation*. Sustaining technologies can be the basis for innovations of radical or less radical type; important is that they help to develop the product along the current lines. Major companies have generally no problems with incorporating sustaining technologies. (Christensen 2001, 21-22)

Disruptive innovations, on the other hand, are based on technologies that seem inferior in criteria relevant to the current mainstream customers but provide an advantage that is lucrative to some who are ready to make the sacrifice. Christensen further distinguishes between low-end disruption and new-market disruption. In low-end disruption the targeted customers are those who do not need the full performance of the current solution. In new-market disruption the disruptive innovation targets customers whose needs were earlier completely unmet. (Christensen 2001, 22)

The reason why disruptive technologies are so dangerous to established companies is that as the technology matures, even bigger part of the customers sees the advantages of the disruptive alternative outweigh its disadvantages. As Danneels (2004) puts it: "Disruptive technologies change the bases of competition because they introduce a dimension of performance along which products did not compete previously." As the technology matures and disruptive alternative becomes more lucrative, the established company responds to the situation by providing more of the same – improving its already-extensive technical quality even more. This pushes it toward a niche-position in the high-end market while the mainstream customers get served by the disruptive alternative (Figure 16). (Christensen 2001, 78-83)

One example of the phenomenon can be seen when taking a look at the camera industry. Digital cameras were first adopted by casual shooters, and only later was the quality good enough to meet the requirements of the professionals. While established camera manufacturers mostly managed to move to the new paradigm, other players in the ecosystem have suffered. (Danneels 2004) The next disruption is already taking place in the form of cellphone cameras replacing the low-end digital cameras.

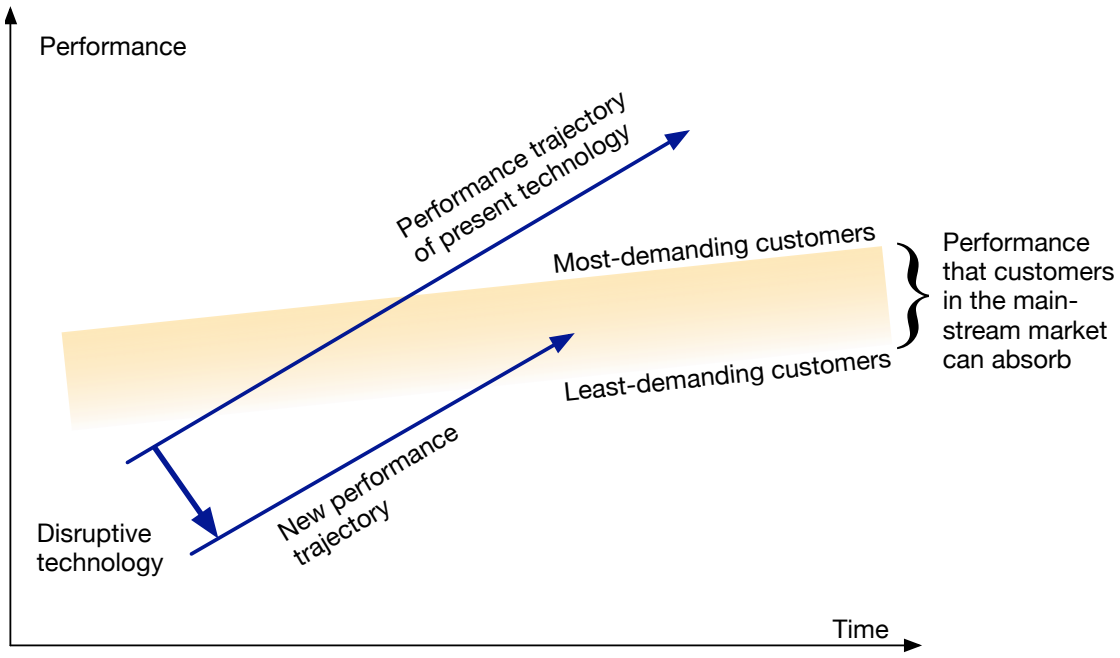

Figure 16 Disruptive technologies provide performance that is initially inadequate for the mainstream market but provides other advantages. Once the technology matures, it becomes ripe for the mass market and forces the old technology toward the high-end niche market. (Christensen & al. 2001)

Christensen lists several reasons why disruptive innovations are problematic to companies, many of them related to business arguments (Christensen 2001, 133). Still, a large part of the problem is due to the superficial understanding of the customers. Christensen acknowledges the same problem than most usability practitioners when saying that traditional customer-centric approach based on listening to the feature requirements of the current customers is not enough (Christensen 2001, 104).

Hamel and Prahalad recognize the same phenomenon in their modern classic *Competing for the Future* (1994). According to them, there are three types of companies: the techology-driven companies that try to lead customers to where they do not want to go, the customer-driven companies that listen to the customers and respond to their articulated needs, and the companies that lead the customers to where they want to go but do not know it yet themselves. The third kind of companies do more than satisfy the needs of the customers, they rather amaze them. (Hamel & Prahalad 1994, 109)

Being a company of the third type is hence all about meeting the excitement needs when talking in the terms of the aforementioned Kano model. Hamel and Prahalad observe that it is necessary to go beyond the traditional market research and point out that industry foresight is the result of senior executives being able to emphasize with basic human needs. (Hamel & Prahalad 1994, 110-112) They suggest that instead of being technology-led or customer-led the company needs to become benefits-led. The goal is to constantly search for technology that will bring unanticipated benefits to the customers. (Hamel & Prahalad 1994, 312)

In the end, what is needed is the ability to imagine the future and get there first. Usability practitioners often criticize the view that time to market is the most important measure of development process and stress that rushing products to the market only causes angry customers. (Norman 1998, 13-14) iPod and Google search engine are provided as examples of products that were not the first to enter the market but the first that were realized well-enough (Cooper 2008, 02:25). Hamel and Prahalad acknowledge the same issue and explicitly state that the goal is not to be the first in absolute sense but the first to find the ideal mix of price and performance that unlocks the emerging market (1994, 197-198).

3.4.2 Lead-users and ethnographic approach

Getting deeper user-insight is critical but the users cannot articulate their needs when asked upfront – what to do? Erik von Hippel's lead user method (1986) is one way of recognizing latent needs before they exist in the market. According to Hippel, there is a certain part of users who tend to innovate and improve the solutions they utilize to better accomplish their tasks. Two characteristics are typical for these lead users:

> 1. Lead users face needs that will be general in a marketplace, but they face them months or years before the bulk of that marketplace encounters them.
> 2. Lead users are positioned to benefit significantly by obtaining a solution to those needs. (Von Hippel, 1986)

Hippel uses the word *user* in a broad sense where it can mean both an individual and an organization or a company. What is common to users is that they expect a benefit from *using* a product or a service. Manufacturers, on the other hand, expect benefit from *selling* a product or a service. (Von Hippel 2005, 3)

Some lead user innovations are related to niche-markets, like various cases where individuals doing extreme sports have improved their equipment. Sometimes these products hit the mainstream, however, as was the case with mountain bikes which were first conceived by avid downhill riders (Witt, 2007).

Another large-scale example of a lead user innovation becoming commonplace is that of the World Wide Web. Tim-Berners Lee's main goal was to develop a tool for his personal need. He was not concerned whether the innovation had the disruptive effect on business models of many companies. In general, lead users tend to be interested in solving their own problems and do not actively contact companies that might be interested in their ideas. Therefore it is the companies that need to go and find the lead users. (Von Hippel 2005, 145)

Hippel notices that lead users are often happy to share their solutions with others with little direct reward (Von Hippel 2005, 77). One reason for this is that keeping the ideas secret and securing them is often difficult. What is more, sharing the innovations for free often has long-term benefits for the innovator. Open source programming movement is a good source for examples of this. (Von Hippel 2005, 85-87)

Lead user theory predates Moore's chasm theory. Hippel has later clarified that lead users are situated even before the innovators in the Moore's graph (Von Hippel 2008). They develop their own solutions before they are available on the market. Where Moore sees the attitude toward technology as the characterizing factor in the visionary group, Hippel does not similarly stress the role of technology. More important is that lead users are experts in their domain and know what is required for an optimal solution.

Hippel notices that innovations developed by established manufacturers tend to be improvements on well-know needs and a great deal of solution information is required to develop then. The innovations developed by users, on the other hand, are based on novel functionality the need for which is discovered, thanks to the profound user-need and use-context information that the lead users possess. (Von Hippel 2005, 8).

3.4.3 Strategic usability

The idea of seeing users as a source of innovation has been embraced among usability practitioners, too. Strategic usability is a school that has emerged in the late 90's, largely based on the work of Stephanie Rosenbaum & al. (1996, 1998, 2000). It strives to define and communicate the benefits that can be achieved by seeing the usability excellence as a company level asset. Strategic usability can be defined as:

> Embedding usability engineering in the organizational processes, culture, and product roadmaps. In strategic usability, usability data contributes to corporate-wide decision-making, such as product priorities and make vs. buy decisions. (Rosenbaum & al., 2000)

The difference between tactical and strategic usability has been clarified as follows:

> Tactical use of usability engineering is responsive and isolated, focusing on adjustments to existing designs, often late in the schedule. Strategic use of usability or user research is proactive and integrated, improving decision making at many levels of project and business planning.(Berkun 2002)

According to Nielsen, the problem with usability work in many companies is that it is tactical, limited to the product level. Nielsen sees the role of strategic usability as

advising on major investment directions, changing corporate culture, and structuring the organization to deliver optimal user experience. (Rosenbaum, 1999) Based on his experience at Nokia Kapanen suggests (1998) that internal stakeholders that get benefits from usability are not restricted to R&D and marketing, which were discussed earlier. Instead, there is a positive effect throughout the company (Figure 17).

Where Nielsen sees that successful tactical project level usability requires changes initiated at the strategic level, other practitioners go even further. Rosenbaum suggest that ethnographic research can inform strategic decisions about both product design and marketing (1999). This involves utilizing usability data when deciding which products to develop in the first place. The user data is helpful when planning the product scope, compelling feature set, and early design prototypes (Rosenbaum 1996).

Along the same lines, Norman asks whether the traditional idea of studying first and designing then should be forsaken (Norman 2006). According to Norman it is too late to study the users and discover what the product should be once the product is announced. After all, the announcement already sets the scope for the project. He argues that field studies, user observations, contextual analyses, and other methods used to find out the needs of the users should be done outside the product process, before starting the actual design projects. They provide the information that is needed when deciding what products to build and which projects to fund.

Norman suggests separating field and observational studies and the conceptual design work from the actual product project. The former harvests data that can be used when deciding about new products. The latter supports the user-centered development process like described earlier. (Norman 2006)

Berkun points out that most managers are somewhat familiar with ease of use. Usability or customer satisfaction is often listed as a goal in the vision documents. What is missing is the connection between those visions and the development process that fulfills them. Hence it is useful to be able to connect the usability goals with business goals, both at product and corporate level. Such higher level goals might include obtaining more market share, increasing revenue or partnerships, or winning reviews against competing products. (Berkun, 2002)

Figure 17 Usability work has various stakeholders inside a company. (Kapanen, 1998)

Rohn (2007) remarks that the role of usability depends on the business goals. When aiming to be the market leader in music-recording software, early-phase activities come in handy for supporting innovation. Should the business goal be to neutralize a competitor's lead in online bill payment, innovation is not similarly required, so interaction and visual design can be based on the known requirements of the existing services to create a competitor.

Strategic usability has still a long way to go and few companies have executive level usability champions (Norman 2006, Schaffer 2007). One example of a company that has seen the value of usability at this level is Nokia. Korhonen (2000) tells about the evolution that the Usability Group in the Nokia Research Center has gone through. In 1994 they started by doing usability evaluations in the form of heuristic analysis and usability tests. From this stage they moved toward product design and even further to user research. It is notable that the direction was toward the beginning of the project, where the influence is the greatest. While moving forward, the group taught their knowledge to members of the project teams they had worked with and spread the skills.

Reaching the level of strategic design was the last step in the evolution of the group. At this level the design and research process is started well before product development decisions. The starting point is vague and typically involves a new technology, an attractive user group, or an interesting social phenomenon. Korhonen

notes, referring to Norman (1998), that this way the usability group has the possibility to take the initiative and reach a position equal to marketing and R&D. (Korhonen 2000) Nowadays user experience has institutionalized its role in product development. Roto & al. report (2008) that the process starts by examining user needs and behaviors. New concepts are then innovated by reflecting user data with market insights and technological opportunities.

Usability maturity is a way of classifying the level of usability activities in a given company. Several models exist, varying in their depth, terminology and amount of steps. Nielsen (2006a; 2006b) has suggested an 8-step model, which reaches from *hostility towards usability* to *user-driven corporation*. He views rather pessimistically that it takes a company twenty years to move from the step 1 to step 7 and another twenty to reach the last step. Korhonen provides another cumulative growth path toward strategic usability (Kapanen 2007)[14], following the stages of the evolution of the usability work in Nokia (Korhonen 2000):

1. No usability activities
2. Scattered usability activities
3. User feedback collected systematically.
4. Usability tests. Problems fixed before launching the product
5. Task analysis and usability tests for prototypes before starting software coding. Problems fixed before implementing the product.
6. User research made before concept design. Product ideas based on knowledge about users.
7. "Strategic Design": Usability work looks for new product areas and previously unidentified user needs, based on very good knowledge about users.

3.4.4 Strategic usability along other current movements

End-user based innovation has links to other larger strategic movements. Open innovation, a paradigm proposed by Henry Chesbrough in 2003, is concerned with distribution of innovation. The main premise is that in a world of widely distributed

[14] Steps 1-2 are added by Jussi Kapanen in 2002. (Kapanen 2007)

knowledge, it is no longer feasible to rely on the internal R&D laboratories of a company but wider networks of innovation are needed (Chesbrough 2003). Chesborough lists phenomena like the mobility of skilled workers, the increasing role of venture capital, and the increasing capacity of external suppliers as drivers why the traditional closed innovation paradigm is becoming obsolete. (Chesborough 2003, 34-40)

Companies are encouraged to network and both license innovations from other companies and sell away the ones that are not considered essential to the companies' own strategy. The intellectual property (IP) management transforms from excluding the others from benefiting from one's innovations to advancing one's own business model and to profiting from the competitor's use. (Chesborough 2003, 51-52)

The *business model* is a central concept in the model. When companies are no longer constrained by the technologies they have developed internally, they can easier break free from technology-centric mindset. It is stressed that technology by itself has no single objective value. Indeed, two of the first aspects that are considered in the business model are related to the users. The *value proposition* is defined as the value created for users by the offering based on technology. (Chesborough 2003, 64) When identifying the market segment it is again suggested to go down to the level of users instead of general customers and finding the specific users to whom the technology is useful. (Chesbrough 2003, 64) Chesborough stresses the role of the business model as a cognitive map that connects the technical and economic domains and facilitates communication between these parties. (Chesbrough 2003, 69)

Clearly, there is no mention of user experience in this construction but the role that the business model is given addresses some of the same questions. It is noted how technical managers do not necessarily understand the benefit to consumers from increasing the capability of certain technology but the business model may explain how this affects the value proposition to a specific group of customers. Similarly, the marketing managers can utilize the business model when estimating which technical improvements can be converted into higher prices and greater market shares. (Chesborough 2003, 68-69) It seems reasonable to assume that strategic usability has its share in contributing to the creation of the business model.

Chesborough acknowledges the role of users as a source of innovations, even though he does not explicitly state how they should be included in the process. Referring to

Hippel's lead user theory (1986), he considers users as a valuable component in the innovation process and concludes:

> Before, companies chose to wait until the technology was "ready" to ship to customers. The mind-set was "We know what they want, and they'll wait until we say it's ready." Open Innovation companies invite the customer into the innovation process as a partner and coproducer. "Here are some of our thoughts, and here's a product that features them. What can you usefully do with it? What can we do to help you do something even more useful? (Chesborough 2003, 56)

Another recent idea that is linked to profound user knowledge is that of blue ocean strategy (Kim & Mauborgne, 2005). The fundamental idea is that it is often more beneficial to determine a new uncontested market space, a *blue ocean*, instead of fiercely competing in the current market place, the *red ocean* (Kim & Mauborgne, 2005, 4). Where the role of strategy in a competitive environment is about making the value–cost trade-off, the blue ocean market seeks to break it. While open innovation largely stresses the role of technological innovation – be it in-house or external – blue ocean strategy is based on *value innovation* instead and states that it is often possible to open new market spaces without any technological breakthroughs.

The call for action for creating these markets is analogous to many of Christensen's (2001) thoughts. It is important to stop thinking about the current customers and instead find out what could be useful for those that do not use the product or service yet. The sequence of blue ocean strategy suggests considering following aspects when testing whether the idea might be viable: *buyer utility, price, cost*, and *adoption*.

Of these the buyer utility is strikingly similar to the notion of user experience by Norman (1998). Aspects like simplicity, convenience, fun, and image are considered at various stages of using the product – ranging from purchase and delivery to use and maintenance and all the way up to disposal. (Kim & Mauborgne, 120-124) What is more, several example cases are presented were ease of use is seen as a relevant differentiator factor when creating a new blue ocean.

The idea of *imagination challenge* proposed by Alexander Manu (2007) follows similar lines of thinking. Starting from the idea that technology per se cannot be monetized but the behavior that it facilitates (2007, 25), Manu sees there are two types of innovation: tactical and strategic. Tactical innovation requires creativity. It involves improving current products and solving problems that are already known and is hence related to Christensen's (2001) supportive innovations.

The creation of strategic innovations requires imagination. According to Manu it is the tactical innovations that protect and strategic ones that create. That is the difference between adding and creating value. As a figurative example of a strategic innovation he gives an eggbeater. Adding a motor to it is a tactical innovation. It makes beating the egg easier but the egg does not know the difference. (Manu 2007, 42-43)

In order to be able to come up with strategic innovations, Manu suggests the familiar paradigm change: instead of starting the innovation process from the functionality that a new technology provides, one needs to rather start from an experience or an event (Manu 2007, 40). He, too, sees users as a significant source of innovation and provides an intriguing lead user example of Dick Fosbury, the inventor of the flop style in high jumping[15].

3.4.5 Connecting UCD and the process of innovation

Looking back at the process of user-centered development presented earlier in chapter *2.4 User-centered design*, it can be noticed that projects are assumed to be initiated by managers without any explicit considerations where they initially get the ideas. The process hints toward the possibility that users might affect the initiation stage of the process but they are in a small role nonetheless. Similarly, the process described by Detweiler (2007) shows how the UCD process traditionally stars after

15 When foam rubber replaced sand and wood shavings as the material of the landing box, this was generally considered a tactical, continuous innovation but Fosbury saw the opportunity that emerged thanks to this discontinuity. Earlier the jumpers had utilized the straddle method, jumping face down, but the new material afforded landing back first. This made it possible for Fosbury to develop a new, more efficient flop style and win the gold medal in 1968 Summer Olympics.

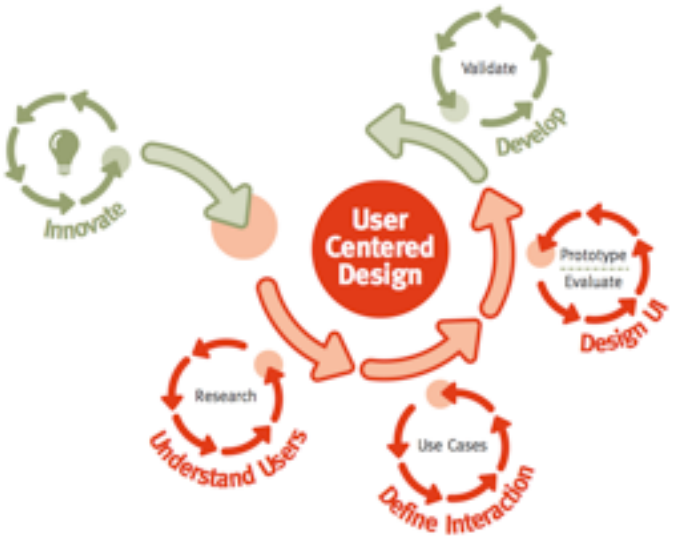

Figure 18 Traditionally, UCD process starts after the innovation has taken place. (Detweiler 2007)

the innovations have been made (Figure 18). Considering what was said about strategic usability, its role seems to be to contribute to the innovation phase.

The early phases of development processes have been under scrutiny recently as systematic approaches to innovation have been developed (Dubberly 2008, Vogel & al. 2005). Koen & al. (2006) divide innovation process into *fuzzy front end* (FFE), new product development (NPD) and commercialization. User-centered development can be seen as one version of new product development process. As the name implies, fuzzy front end is often chaotic, unpredictable, and unstructured. Koen & al point out that typically FFE has consisted of a single ideation step but they observe that the stage is more iterative and complex and propose a model to support it.

The new concept development model (NCD) provides a definition for some of the key components of the fuzzy front end. It does not suggest a linear process, rather different components can be iterated in any order and in parallel. The *engine* represents executive level management support, while the outer ring of the *influencing factors* contains various environmental variables, like organizational capabilities, customer and competitor influences and the possibilities of the enabling technology. The two arrows pointing into the model represent the two alternative starting points and the outward pointing arrow represents how concepts are ready to proceed to the new product development process. (Koen & al. , 2006)

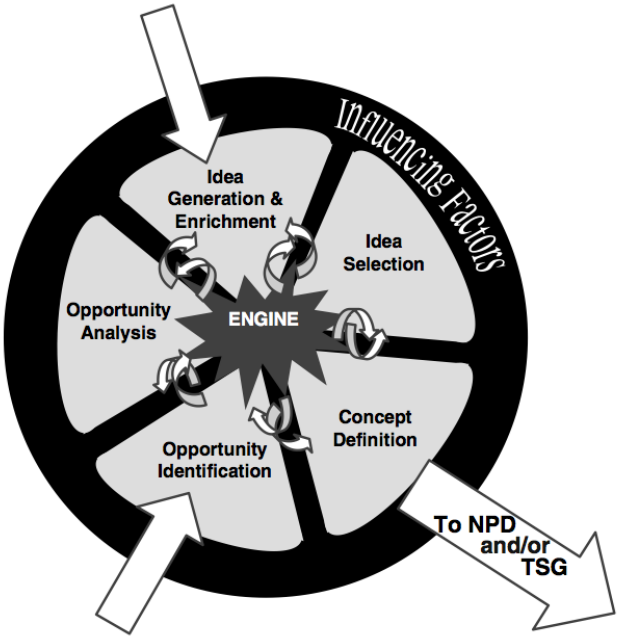

Figure 19 New concept development model is an attempt to bring structure to the fuzzy front end. (Koen & al., 2006)

A study of the innovation processes of 11 major corporations[16] and of the role that design has in developing products and services also shows an increased attention on the early stages of the process (Design Council 2007). There may be differences in terminology but the following four stages can be found in every company: *discover, define, develop*, and *deliver* (Figure 20). Each of the phases further consists of iterative loops where ideas are tested and refined. The phases follow each other in the shape of a double diamond, which implies how the scope diverges and converges in turn.

The discover phase corresponds to the fuzzy front end and as the divergent shape demonstrates, this is the point where a wide overview of the given domain is created. Various methodologies are utilized at this stage, including user research which has its role in identifying:

- How users are accessing current products and services
- Areas for improvements or innovation
- Opportunities for new products and services that will address a user need (Design Council 2007, 11)

[16] Alessi, BSkyB, BT, LEGO, Microsoft, Sony, Starbucks, Virgin Atlantic Airways, Whirlpool, Xerox, and Yahoo!. The concept of design is used rather broadly here and it can mean different things in different companies, ranging from industrial design to service design and user experience design.

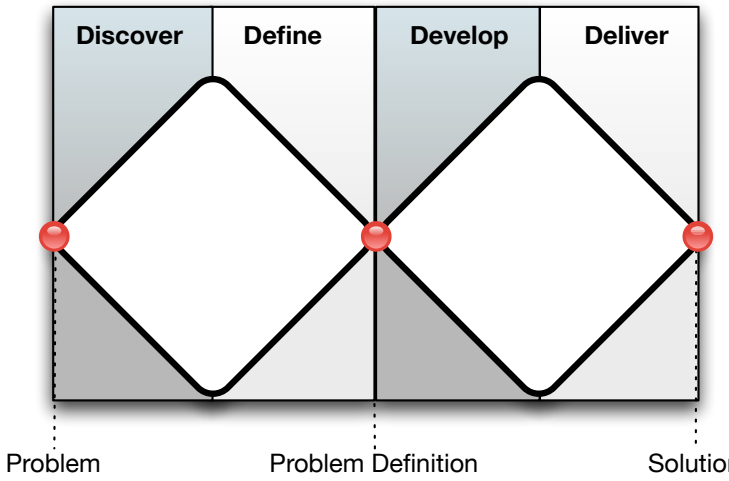

Figure 20 Diverging and converging phases follow each other in the development processes of the companies, as observed by Design Council. (2007)

The methods used range from more lightweight usability oriented focus groups and in-depth interviews to more detailed ethnographic and observation based techniques. The ability to concretize ideas with storyboards and prototypes is specifically considered useful.

Vogel & al. (2005) suggest a process highly similar to the one presented by Design Council[17]. It starts by defining the strategic area of importance where the opportunities are to be identified. Opportunities are seen to come up as a result of gaps between three factors: social, economic, and technological. Where Koen & al. (2006) see opportunities to be either technology or business gaps, the notion of social behavior gaps, also recognized by Manu (2007, 40), stresses the role of user research at the early stages.

The goal of the recognition phase is to identify one product opportunity, which can be expressed in broad terms without getting fixed to one particular solution option at this stage. Similarly to Design Council, Vogel & al. stress the role of carefully defining the problem before rushing into solutions. (2005, 170)

[17] The terminology is rather amphibious, though: where Design Council sees that the discover stage corresponds to the fuzzy front end, Vogel & al. consider the process as a whole to represent the fuzzy front end, even though it includes steps that are similar to the later phases of the Design Council model.

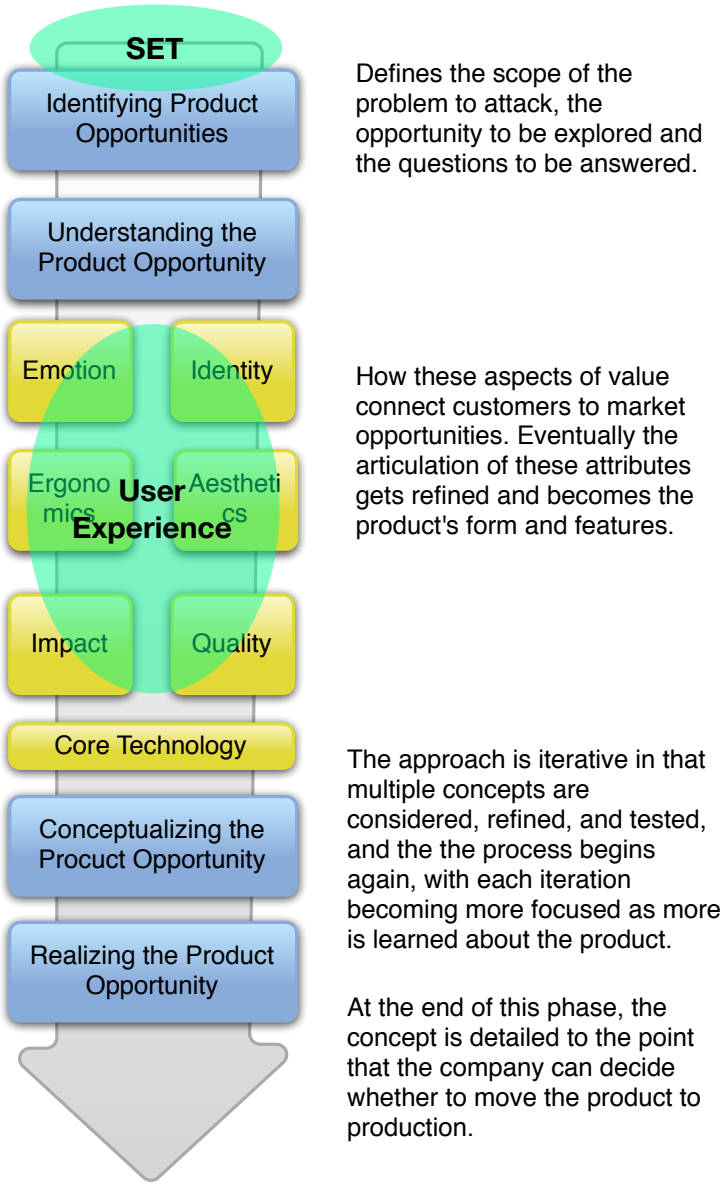

Figure 21 Social, economic, and technical gaps exist in the marketplace and provide opportunities that can be systematically investigated. Once the opportunity has been discovered, the process continues much like any UCD process would. (Based on Vogel & al. 2005, 169-181)

The next stage is understanding the opportunity. Here the customers' expectations of value are discovered to be later turned into product attributes. For this translation a *value opportunity framework* is suggested. It includes the elements of emotion, ergonomics, aesthetics, identity, impact, core technology, and quality. Excluding the technology, it can be seen that the components easily represent the various aspects that were earlier connected with user experience. Also the methods that are suggested for finding out these attributes are highly similar to those, utilized at the early stages of the UCD process.

In the conceptualization phase the attributes are further refined in an iterative fashion, very much like in traditional user-centric design approach. Finally, in the realizing phase the business case is completed to that level that the company can make the decision of continuing to implement the product or ending the project.

In this chapter is has been seen how usability work is linked to other parties in a company and how it has two kinds of roles when it comes to innovating new products and services. On one hand, paying attention to usability makes it possible for technical innovations to be adopted by the large majority of people who are not interested in technology per se. On the other hand, the approach of usablity engineering can contribute to the actual innovation process.

No longer are the business opportunities based on solely technological breakthroughs but it is increasingly important to understand the social and behavioral phenomena that exist in the market. This is why various sources notice that being customer-centric in a traditional way is not enough but deeper knowledge of the people – be they called customers, users, or consumers – is needed to stay ahead of the competition.

The companies that have seen the benefits of using user research as a contributor for early stages of innovation process also seem to have a solid track record of user-centered design. Indeed, the theories of usability maturity suggest that there are no shortcuts to strategic usability.

It remains to be seen what happens when companies follow the business literacy that suggests an approach similar to strategic usability without explicitly stating the role of the traditional tactical usability work. There is a possibility that companies become highly competent in finding latent needs and innovating product concepts based on the needs but having never seen the value of the traditional usability work, lack the skills of developing the actual products in a truly user-centered fashion.

4 Usability at Elisa

This chapter deals with the current role of usability work in Elisa. Mainly based on the internal discussions with 13 key employees, it seeks answers to following questions:

- What is the current level of usability maturity in the company?
- Which reasons have led to the current situation?
- How relevant an advantage is usability excellence deemed to be in new service development?

The main focus is on consumer business and more specifically in the process of developing new services for both existing and new markets. As the processes of new business development are not that tested and there are only a couple of products in the market open for discussion, the traditional product life cycle model of the company is also discussed. Due to the sensitive nature of some of the information, not everything is disclosed but the handling is kept as open as possible to be able to provide a meaningful example case. The results will be discussed in the chapters *6 Analysis* and *7 Discussion*.

4.1 Company information

> Elisa is a leading Finnish communications service company whose mission is to offer its customers telecommunication services for fast, effective and secure communication. Its vision is to be the most attractive and effective operator. (Elisa 2008, 1)

The strategy of the company has three parallel phases. The first one deals with integrating the company to operate as one unit after a series of acquisitions in the beginning of the decade. The second is about strengthening the market position in the traditional business areas: mobile and fixed-line telecommunication services. The third – and most interesting from the viewpoint of this study – is to create new services for new markets, both in Finland and abroad. (Elisa, 2008, 2)

Historically, the telecommunication market has been strongly technology-driven and regulated. During past decades Elisa along with other companies has taken large steps toward customer-centricity. Still, the rate of adaptation of new mobile services has been disappointing to many. It has been argued that while the marketing at Elisa has succeeded in communicating outwards to customers, listening to them and answering to their actual needs has not been as successful. (Pantzar & Korkman 2006, 6, 9)

The fast 3G mobile networks were hoped to support the creation of new, innovative services, which in turn would generate more traffic and finally profit for the operators. What has really happened is that people do not select a 3G phone because of the services available. Instead they are more interested in the features the actual phone has and find the bundle deals financially lucrative. Regarding the broadband connections, the situation is largely similar. The majority of users have not seen the benefit of upgrading the connections to higher speeds, as long as the current connections have been more than adequate for the services that are used. (Viestintävirasto, 2008)

Despite the setbacks, the demand for 3G connections is on the rise and already almost a fifth of Finnish mobile users report that they browse the Internet regularly on their phone. (Viestintävirasto, 2008) Elisa has a strong position in 3G connections, with the market share of approximately 50% in Finland (Elisa 2008, 1). This is largely due to the successful preparing for the change: when the Finnish legislation allowed bundling the calling plan with a phone, Elisa was well prepared and had thoroughly considered, how to provide an easy hassle-free experience of buying a suitable package. This is often mentioned as one the most relevant success stories of customer-centeredness from the recent history of the company.

During the past couple of years Elisa has wished to stray away from price wars and start competing with services instead (Elisa 2008, 2). As a result the corporate aspiration toward easiness is high. Elisa uses the slogan *Elisa makes it easy* prominently in its advertising and *customer-orientation* is listed as one of the four core values of the company. Then again, the examples provided about customer-orientation are still rather technical by nature: *100 Mb/s broadband connections, HDTV channels in the cable network, Wippies WLAN-service*. (Elisa 2008b)

Pantzar & Korkman (2006, 44) have suggested that the company should also study the everyday life of its customers from a non-technical point of view. They note that many services that have since became success stories were not originally meant for the purpose that the users eventually ended up adapting them. Nobody knew in advance that teenagers had the need to communicate with SMS, for example. Pantzar & Korkman stress the users' role as innovators and see that the operator should change from a gatekeeper to a facilitator. (Pantzar & Korkman 2006, 42)

One significant move toward deeper user insight was the *Customer day* project, organized in the fall 2006. Arguably the largest ethnographic study ever organized in Finland, it included 420 Elisa employees who encountered 1000 customers, better to understand their problems and sources of frustration in everyday life. Besides gathering insight from the users, another important goal was to spread the customer-centric mindset throughout the organization. (Mattila, 2007)

The results were used to both improving current services and finding markets for totally new ones. Utilizing the results has reportedly succeeded rather well in the solutions targeted at corporate and small enterprise customers but in the consumer business several findings are yet to materialize as products. Some of the results have been used as points of departure in the New Services and Markets Unit where the development of the new services that are related to the third phase of the strategy is concentrated. As an example of a service created there can be mentioned Traxmeet.com, a virtual sports community, which was launched at the end of the year 2007.

4.2 Methodology

The discussions took place in the timeframe between the end of 2007 and the beginning of 2008. In total 13 key employees were met, ranging from project managers and business managers to executive level representatives. Usability involves different stakeholders and the group of interviewees reflected this fact, for there were people from different functions of the company.

The structure of the situation was a combination of an interview and a presentation. A presentation, following loosely the structure of the theory part of his report, was given and questions were asked based on the material presented (Appendix 1). This

way the valuable time of the interviewees was preserved, yet they were better able to understand the issues and answer the questions more insightfully even without prior exposure to the topic. The average duration of a discussion was about one hour and fifteen minutes.

The nature of the study was qualitative, as these kind of organizational questions were not considered quantifiable in a meaningful way, especially given the varying backgrounds and organizational roles of the respondents. What is more, the semi-structured discussion left room for respondents to freely concentrate on the issues that they found out to be most important. On the other hand, no time was wasted with topics about which the respondents felt they had nothing relevant to say.

4.3 Results

This is a compilation of the results collected by the interviews. The results are discussed in chapters *6 Analysis* and *7 Discussion*.

4.3.1 Overview of the situation

What are the strengths and weaknesses of Elisa when it comes to designing the new services to support growth after the traditional telecommunications market has saturated? The opinions varied and there were slight differences in the viewpoints due to the different backgrounds of those interviewed.

The point that rose above others was the sense of urgency. That the company has understood the situation and that the top management is committed to acting were seen as absolute requirements for the change to happen. Having a steady financial situation and a secure position in the home market were considered a good basis for new ventures. The example case of 3G bundling was also repeatedly mentioned as a success story of customer-centeredness.

Nevertheless, the respondents were skeptical whether customer-centeredness could currently be considered a strength of the company. It was mentioned that despite good intentions, the actual processes leave little breathing room and the ideas are often lost in the process before the products get to market. Moreover, it was questioned whether the company knows what the difference between good customer service and designing good services for customers is. “Good customer service means

that customers get through when calling to the help-desk, and this is what we are currently dealing with. Good services, on the other hand, work so that the customer does not have to call at all," one respondent said.

Another considered the lack of usability to be the most important reason why services like mobile Internet have not became more widespread. "What is more, it is not just that people do not know how to use something. The problem often is that they do not understand the concept of the service to begin with. What was it that the service was supposed to do again? What kind of bills am I supposed to expect?" he elaborated.

One of the challenges often mentioned was that of slowness in actions while at the same time it was commented that there is not enough patience for long-term decisions. All in all, the ability to take risks was doubted. The people working close to the new service development commented that lack of resources is a challenge. There are not enough people to choose from and the in-house skill set is rather narrow.

4.3.2 Usability and user-centered development

In general, the concept of usability was well-known among the interviewees. When asked to explain how they see usability, the first reaction was that it is easy to start using a product or service, hence reflecting learnability in Nielsen's terms. It is worth mentioning that nobody assumed the term to mean the same than availability[18], also sometimes called usability.

The idea that usability contains a broader range of issues than mere easiness and includes measures like efficiency was well received and having heard this, people spontaneously provided examples of systems that require unnecessary effort from the user. The fact that usability is an official concept to the point of an ISO definition was surprising to many.

Concerning the process of developing new services, the common agreement was that the process has traditionally[19] been linear with little room for iteration. The general

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[18] Availability is the proportion of time a system is in a functioning condition. (Wikipedia 2008)

[19] This excludes the New services and Markets Unit which has utilized a more flexible way of developing products.

agreement was that the process should be more iterative but despite the fact that individual people understand this, the situation does not seem to change. One of the reasons mentioned was the lack of control. As a result of outsourcing there are several parties involved in the development process which often makes it challenging to change things later on.

The idea that a product can be hardly changed once the development has been started has resulted in a tendency to try to create extremely precise technical requirement specifications. This takes time and often leads to products that do not meet the user requirements any more once they get finished. It was mentioned that specification stages take so long that if there ever was a cycle, it starts to look like a line. "Much in the same way that the circle of the CERN particle accelerator looks like a straight corridor when seen from inside."

Another view was that inside the company the mindset is that the market is the only real acid test for a product. Results that are got by testing concepts and prototypes are not believed to be any more valid than development team's or manager's own intuition. Hence testing the products with actual users has often not been considered worth the additional effort. One related challenge that was mentioned was that people like to develop products they would use themselves or their colleagues would respect.

It was acknowledged that experimenting directly on the market is feasible when the product is simple, like a calling plan where price can be used as a variable. As far as totally new concepts are concerned, it was stressed that one should make the product so easy that the users get to the point of evaluating the idea rather than the lacking implementation. Some also remarked that the first impression can be given only once, so ruining the reputation of a product with a lackluster first version may have a long-lasting effect.

Introducing public beta-versions was suggested as a method for experimenting with unfinished products. Some concerns were raised, however, that it would not be good for the current Elisa brand. The major challenge with public betas was seen to be that they require the competence of flexible implementation and are not compatible with the mindset where things need to get ready with the first iteration.

The way that Saunalahti[20] has been able to develop new products and bring them quickly to market with the help of its agile in-house development team was seen as a recommendable alternative way of doing things. A former manager at Saunalahti, told that they never explicitly designed for usability when bringing new products to market. “Products like SaunaSync and the FTP service IsoG were developed with *fire and forget* method and practically require an engineer to set up,” he said. In hindsight, he considered this was possibly one of their mistakes and that added attention to usability might have helped the products do better in the mainstream market. The same view was echoed by some other interviewees.

Moore's chasm theory was widely seen as a good model of explaining the demand for different products and there was not a single person who was not familiar with the general principle of the model. The theory was seen as an apt explanation to the adoption of 3G phones: even though the bundling had made it easy to get a 3G phone, compelling reasons to do so were seen to be lacking for many. In general, it was agreed that recognizing phenomena that are yet to cross the chasm and bringing them over to the large majority is a suitable role for Elisa, whereas Saunalahti targets more to the earlier groups. As for breakthrough products that are internationally competitive, the mere chasm crossing was not considered to be enough, though.

One respondent criticized Moore's theory for being too greatly driven by technology. She advocated Hippel's lead user model and reminded that often the people who innovate new solutions happen to be interested in solving their own problems and are not characterized by their technological capability. Another interviewee stressed that it is not just the question of how mature a given product is by its implementation because there exists a similar bell curve of what people really want. Making something easy is pointless if it is not initially wanted.

The relationship between marketing and user experience and the argument that marketing does not know what users want was not directly accepted[21]. People with the background in marketing stressed that not all marketing is restricted to simple quantitive market studies and that also marketing understands the importance of

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[20] Saunalahti was a service operator that Elisa bought in 2005. The brand is still in use in the consumer market and is targeted toward the more price conscious and technologically advanced customers

[21] It is worth noticing that terminology caused some confusion, as the actual marketing department at Elisa does not have as broad a role as in the referenced literature.

easiness. The separation of the customer and the user was new to many and some considered it to be only semantical. The observation that consumer software products tend to be better designed than those targeted to business users was widely accepted, though, and the trend of consumerization was considered relevant.

The argument that users often do not tell what they need when asked upfront was well received, as was the idea that extra features do not necessarily improve the product. It was mentioned that people like to ask for what they do not actually want – and reject ideas they eventually end up liking. As one respondent put it "Few know what they want but everybody knows what they like once they use it".

4.3.3 Service design and user experience

When it comes to creating innovative services that delight the users, the general opinion was clear: they are eagerly wanted but thus far largely missing. The aspired role of the operator was seen as broader than that of a *bit pipe,* providing the technological infrastructure but little more. “It is painful for many to face the reality that ordinary telecom services are nowadays a low-interest product,” one respondent concluded.

It was agreed that when the service does not work, it evokes anger but when everything goes as planned, people are hardly specifically delighted. Speedier connections increase the satisfaction to some extent – for the users who have found a need for them. To underline the situation, Kano model was used to demonstrate how a broadband connection – once having an aura of excitement around it – has during the years descended on the ladder of interestedness and is now largely considered as an answer to a basic need.

All in all, the idea of user experience, as opposed to traditional usability, was well received. Several people had had the change to try out the iPhone and mentioned it when asked to name an example of a pleasant experience. The encounter with the device had got many convinced that great user experience is possibly not even a way to differentiate from the competition but will soon be a necessity for survival.

Despite the reserved attitude toward the current situation, the general mood was optimistic. It was believed that an operator has all that it takes to become an interesting company that its customers can be proud of. Japanese DoCoMo was

given as an example of such an operator. Changing the focus from technology to services is not exactly easy after all, and it was mentioned that even Nokia has had difficulties in this process.

Internationally speaking, it was noted that the situation in Finland is not as consumer-hostile as in some other countries. Here the operators do not tie the customers to long contracts to guarantee a steady revenue stream or disable features of the phones in order to force the customers to use the operator-provided services. Quite the opposite: Saunalahti provides consumers with means of using cheap VOIP-calls and Wippies project encourages people to share their broadband connections with others.

4.3.4 Support for user experience in organization

The general idea of the chair model of technology, marketing, and user experience was found to be illustrative – with the exception that the use of the word marketing was sometimes criticized for being too narrow. It was repeatedly pointed out that user experience has no official role in the current highly product-centric decision process. The budget and the schedule pressure were reported to drive the development.

It was further observed that even if some people have the knowledge and motivation to pay attention to usability, this is easily left undone when it is not specifically required and other matters take the time. What is more, there is no reward model for improving usability and no direct enough measures for it in the company scorecard. "It is an unwritten rule that usability is important and in theory the project manager should take care of it but currently its role has not been officially stated in a way that it would drive the actions" one manager told.

The model of internal stakeholders of usability work as suggested by Kapanen was seen to be viable, though not perfectly applicable to Elisa due to some differences in the company profile. It was pointed out that the flow of information from customer service to service development is rather weak. A more systematic approach to the issue had been tried earlier but it turned out that it put a heavy load on the project managers without bringing much benefit. Again, it was mentioned that making changes to systems is expensive and time-consuming “filling of service requirements”.

A commonly asked question that came up in the discussion was what the requirements and criteria for user experience would contain and especially, how they could be presented in a quantitative form. It was seen that technology is a fact, and the market view is based on the business case calculation – but the means of concretizing user experience were required. One respondent noticed that during his years at Elisa he had seen several business plans and many a technical specification but not a single specific documentation related to user experience.

Even though there was demand for concrete measures, justifying usability work with ROI calculations was, by and large, not considered to be the optimal approach. While usability was seen as a necessary success factor in any consumer product, it was pointed out that figures can be easily collected in such a way that they indicate whatever they are wanted to indicate. One respondent with a financial background even argued that the way that usability ROI connects usability to hard figures seems artificial and rather decreases its credibility than increases it.

A problem that was mentioned is that even if project managers wanted to pay attention to user experience, they would not know where to ask for guidance. There are no people in the company with the job of user experience designer or interaction designer. Various companies were mentioned to be the official partner in usability issues but few of the companies mentioned were specifically focused on usability consulting. Those near the development of new services mentioned that the Elisa Labs R&D unit is the place where the user research knowledge is concentrated. Then again, not everyone was aware of this and those who were considered the resources too limited. It was commented that there was a need for several full-time designers and especially prototype engineers to work with various projects and quickly concretize the concepts.

Another organizational consideration was whether the R&D unit, which is situated in the technical Production unit, is the right place for user knowledge. It was commented that the current work done in the Elisa Labs is highly research-oriented and rarely directly applicable to current business. Overall, there was an aspiration of getting R&D more closely integrated into current business.

Based on the experience with the R&D department and the challenges to better integrate it with day-to-day operations, the general concern was that a centralized usability department might become restricted from the rest of the organization.

Should the role of user-research be increased in the R&D unit, it was still considered recommendable to have designers who work closely with various projects. Further, it was repeatedly asked whether it was necessary to have specific usability experts involved in every product. Some kind of corporate guidelines that could be quickly applied to guarantee even some level of usability were requested by several respondents.

When considering specifically the usability maturity of the company, based on the criteria presented in the theory part, the results varied greatly. Those who considered solely the traditional product development, saw that the maturity level was somewhere between steps 2 and 4. Those near the new service development gave much higher ratings, one even all the way to the highest level of seven – even though it was acknowledged that some levels from the middle were missing. In general the measures were not considered too describing as they were not exclusive. It turned out to be the case that some activities might have been done even though others at the lower levels were missing.

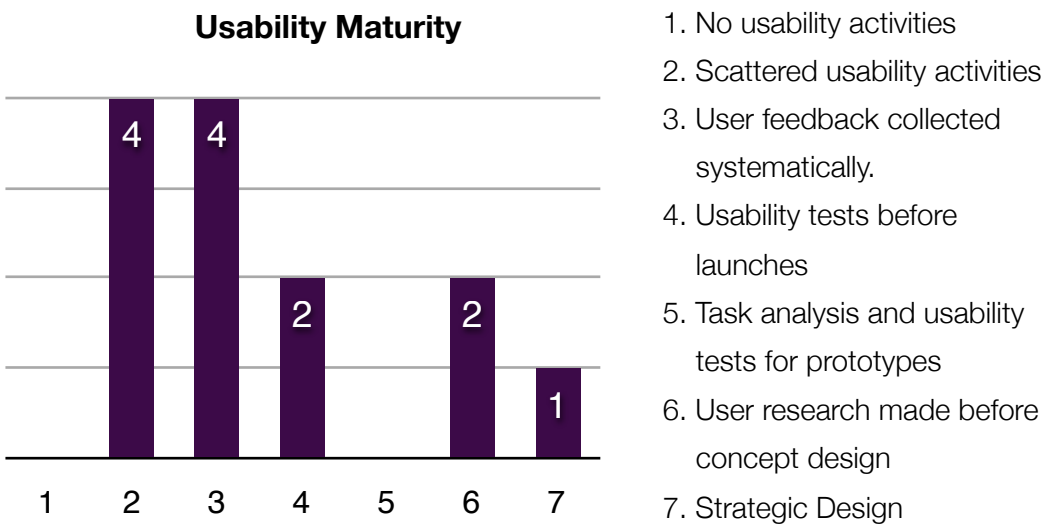

Figure 22 The usability maturity as seen by those interviewed. The higher grades are given by people who considered specifically the development in the new services unit.

4.3.5 Utilizing data collected by ethnographic research

The idea of starting development with general user observation, suggested by Norman among others, was recognized to be rather analogous to the Customer day

study. The opinions about the relevance of the study varied. Some considered that it delivered important findings, while others saw its value to be more in PR and in internal education toward customer-centeredness. One of the issues mentioned was that some were skeptical whether lay members were able to come up with relevant findings having spent just a day with the customer.

The results of the study were considered promising nevertheless, and creating an on-going process of smaller scale ethnographic studies with a more specialized practitioner group has been investigated. Despite these ambitious intentions, it was acknowledged that there are still challenges in executing the discovered ideas in a way that the final product provides great user experience. Currently there are few examples of truly user-centric design projects that have been carried out from start to finish and example cases were considered most welcome. It was understood that this kind of ethnographic study is no silver bullet that guarantees usable results but various other methods are needed along the way. Rather, ethnographic studies were seen as a way of introducing a broader user-centered approach into the organization.

It was further pointed out that to succeed, the process of turning ethnographic studies into an on-going policy and the changes required to be able to truly utilize the findings in new service development need support from the top-management. The original Customer day was well supported and advocated by CEO Mattila himself, and this was seen necessary for the future, too. As one respondent put it: “The order has to come from the top. A small group of people posting process slides to the intranet does not change anything.”

When it comes to utilizing the results in improving the existing services and developing new ones, respondents wished to have an atmosphere that is supportive for innovation. It was considered reasonable that the New Services and Markets Unit is separated from the traditional business units to provide it with greater freedom in operations. The respondents stressed, however, that it is important that also in the traditional service development room is left for innovation.

This concludes the results section of the internal interviews. The results are analyzed and discussed in chapters 6 and 7.

5 Case Game Shelf

This chapter provides an example of a service design project that was initiated based on a general need, discovered by an ethnographic user study. After the general opportunity was discovered, the concept was developed following the principles of user-centered design. *Pelihylly* (Game Shelf) was a web service that allowed the customers to subscribe to a large selection of quality PC games that were delivered digitally. With the help of our early user focus we were able to come up with ideas that created additional value, beyond that of a mere game store.

The core product team consisted of four members: the project manager who was also concerned with marketing, the content manager, the technical project manager (once the project was at that stage), and me, the user experience manager. The project was started in the summer 2007 but was not pursued full-time until in the fall. The project was at the stage where implementation process was ready to be started in February 2008.

As the project was initiated in the New services and Markets Unit, it was free from certain limitations of the traditional service development. All in all, the process was rather experimental and our approach sought to be fresh which also made it possible to integrate the user experience aspect to the project without the restriction caused by tradition.

The structure of this chapter follows the process model presented at the end of chapter 3. There are various interesting technical and commercial issues related to the project but this report only talks about them when they are closely related to user experience. The way the UX design is handled is based on the hierarchical model of the elements of UX, presented in chapter *2.4.4 Reference model for web user experience*.

5.1 Identifying the opportunity

The roots of the project lie in the Customer day study. The group was not asked to develop a certain service but was rather told to investigate a given domain and try to find opportunities from there. The domain our project group was initially given was home. There were various trends affecting in the background. People are ready to put

more money in their living and enjoy being at home. The age structure changes and there are incentives to support the elderly to live at home for as long as possible. As a telecommunications operator already has a relationship with large number of households, it is only natural to try to broaden that relationship.

Entertainment was one of the domains to consider. As a point of departure acted one elderly relative of a project team member. Despite his age, he was active online and liked to play chess against people all over the world. It was quickly understood that *chess for seniors* was not enough to carry a business case. Then again, traditional board games appeal to all ages and they have become rather fashionable during past years as a result of many fresh titles that have been published. Games like *Carcassonne* and *Ticket to Ride* are easy to learn but provide challenge, as they are not similarly luck-based like Monopoly and other more traditional titles.

Board games have their disadvantages: they are rather expensive, storing them takes space and taking them along when visiting friends is cumbersome. We wondered if it would be possible to create web versions of them and let the customer subscribe to a large library of quality games with a monthly fee.

Considering the possibility we found out that unlike consoles, personal computers are not specifically well suited for multiplayer experience where people are situated in the same room. Their strength is in the network multiplayer game. Further, the PC is generally not located in the living room because people are not ready to bear with the technical challenges still related to PCs – not in their living room. Various entertainment devices that are trying to get a foothold in consumer's living rooms but are not specifically designed for games were also investigated. It was found out that the gaming experience that they could provide was inadequate even if the content existed.

When it comes to content, it was known that digital versions of board games were available already in the nineties when the first CD-ROM games arrived – and they never fared well. Even the advantage of the renting model and the added value by features made possible by the web combined with the ubiquity of computers that would be powerful enough were irrelevant when considering that the actual gaming experience would be bad.

We took a look at the game consoles. Sony, Nintendo and Microsoft have each been able to create an ecosystem, a total solution containing the hardware, the software, and the auxiliary services. What is more, they had done this so exclusively that there was no role in it for an operator. Had there not been the fact that the game industry was surging at a blazing pace, and the temptation to get a share was big, the project would likely have been given up early on.

It was at this point that we discovered the games on demand (GOD) distribution model of games. It is a way of delivering PC games digitally over the Internet. Traditionally there has been only one relevant sales window for PC games, that of the store shelf. After their short-lived time on the shelf, games are sold on discount in clearance sales to make room for new entries. In the movie industry there are several such windows: at first movies are shown in theaters, then sold on DVDs, and later rented and shown on television. Games on demand model gives the game publishers a similar opportunity to get revenue from the games that cannot be profitably sold via retailers anymore.

The most usual model is to rent a library of games. With a monthly fee of about 10 euros the user gets an access to 100-200 game titles. The general idea is that games are specially encoded and the copy protection is included in the game file. As the sizes of games can be several gigabytes, the download takes considerably more time compared to music web stores. To alleviate this, games are encoded in such a way that playing can be initiated even when the file is not completely downloaded. The immediate benefit for the operator in such a product is that it gives the customers an incentive to upgrade to a faster connection.

Another advantages that the technological solution readily provided was the possibility to automatically check whether one's computer meets the requirements for the game. The distribution model also gets rid of serial codes that are normally used for copy protection and the need to manually download patches and bug fixes to the games.

5.2 Understanding the opportunity

The identification phase was rather simple as we found an existing product that turned out to be promising and we did not have to come up with a totally new

concept. Having decided to look further into GOD distribution model, we were ready to enter the stage of understanding. Considering the model of UX elements, we were at the strategy plane, finding out the goals of the users and the company.

First off, it seemed that the way business had been done in other countries had not been specifically successful. We analyzed the existing services and focused specifically on their usability and content offering. It became clear that they were targeted toward the people who traditionally are most eager to play games, the so-called *hardcore gamers.* The problem was that for these players it was essential that the games are the newest on the market and GOD model is currently not capable of delivering that, since publishers only rarely provide the newest titles to be delivered digitally. A large part of these players also disliked paying for their games. Indeed, piracy is one of the main reasons why PC game industry is facing troubles.

It was also possible that the rental model was not the best option for delivering games. It was reasoned that the optimal business model for digital content depends highly on the type of the content and the way that it is naturally consumed. We observed that games as a form of entertainment are situated somewhere between music and movies. Music is listened to over and over which is why people often want to own it and selling songs has been more successful than renting them. Movies, on the other hand, are rarely watched that many times, which supports the rental model.

At this point it seemed that we were dealing with a disruptive innovation. As the newest titles were missing, the games that could be provided by GOD model were not as good as those that could be bought from the store – but at the same time GOD model had its advantages[22]. First off, the price was lower and lucrative bundles could be created. Secondly, the model provided some technological advances: games could be directly downloaded without visiting a store and the system could test the user's computer and tell if a given game would run on it.

The question then was whether there are users who value the advantages so much that they are ready to sacrifice the fact that the newest games are not available. We

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[22] It is notable that GOD model is not inferior to the traditional physical delivery because of the immature technology but because the publishers do not yet want to fully embrace it. This was assumed to change in the future in the same way that has already happened in the music and movie industries.

found two main target groups. First was families with children who are not old enough to require the newest and the greatest. Illegal downloading is no option for most parents and paying for subscription services is common. Because there are often many users for the service, the price also feels better justified.

Another group was the so-called individual young men. It was assumed that many a young man in his mid-twenties who had played in his childhood but given up since, might find it interesting to effortlessly play every now and then without investing in specific equipment and without being too distracted about the fact that the games would not be the newest on the market. The risk was, though, that they were reluctant to commit to a subscription-based scheme.

Another important trends that were recognized were that of *casual gaming* and the fact that girls were an increasingly eager gamer group. Responding to these trends was largely about content which was not directly in our control, though. Younger girls were specifically decided to be addressed when designing the game offering but we were afraid that individual female adults would not be that interested in the service.

Given that it was the time when Facebook was conquering Finland, the social aspect of the service could not be ignored. Adding community elements was at no point a goal per se but we tried eagerly to come up with ideas that would improve the actual gaming experience. It was assumed that the social aspect would be specifically important for girls as it was known based on research that they tend to find social aspect important in gaming and consider competition secondary.

5.2.1 Insight and ideas from the first focus group

To gain further insight, focus groups were organized. We were careful, not to ask too much for ideas and suggestions but rather asked the participants to tell about the relationship they had with gaming. This information then either proved our assumptions wrong or right. Based on the information, we were also able to collect common problems that the service should solve.

The first focus group was organized with the group of young males at their mid-twenties. They were generally not interested in subscribing into services because they felt that they were too busy to take full advantage of them. The participants had

a positive stance on the service but they were afraid that they would not have the time for it. Lack of time was also mentioned as the main reason why many of them had given up playing after their teenage years. It was pointed out that multiplayer games, though interesting with friends, are hard to set up as there are little such moments when all the friends are available at the same time. Playing against anonymous players online was not considered as interesting.

Three further notions were made. First was that the large amount of games in the library was not automatically seen as an advantage, rather the other way around. The participants said that they would rather pay for what they use. If one only plays three games and pays for the right to play one hundred, it does not feel fair.

The second notion was that older games possessed a quality of nostalgia to many. The idea that one could select *Civilization* and play all the versions ever made, starting form the early 90's, was considered lucrative. Another interesting point in the matter is that publishers generally value games solely on the basis of their age and do not see that certain old classics might have special value to the players. All in all, it seemed that there certainly was a possibility of getting the advantage of the long tail effect with this distribution model, provided the content selection would be broad enough. The third notion was that the idea of presenting the games on a shelf was well received. We presented various ideas that the service might have, mainly related to the social aspect, but that was the only one that really stuck at this point.

Based on these findings, a virtual euro model was created. There the users could choose themselves which games they would like to include in their package. The more they would pay monthly, the more virtual credits they would receive. Besides giving more power to the users, this model also implicitly communicated the great value of the deal. Supposing that the monthly fee had been ten euros, the user might have received 400 virtual euros to shop games with.

5.2.2 Starting with the shelf

The warm welcome that the initial shelf had received encouraged us to continue experimenting with it. This is against what was suggested by the UX elements model: I skipped partly all the way up to the level of visual design even though not even the strategy plane was completed yet.

The idea of using the physical game boxes in the service was highly analogous to the case of compact disks and the way how cover art has received more attention during past years. Apple, among others, has given the cover art a prominent role in its iTunes service. The images are automatically loaded even if the user does not choose to buy the songs from the iTunes Strore. After this, the covers are presented in a lush Coverflow view, which lets the users to flick through them in a manner similar to browsing a jukebox. On the iPhone the metaphor is taken even further. When the covers are tapped, they turn around, revealing the list of songs contained by the album. This list then acts as a controller for song selection.

As mentioned in the theory review, the road of mimicking the real world in interfaces is a dangerous one. Slate web magazine is one warning example (Garrett 2003, 90), Microsoft Bob is another (BentUser 2005). There exists the risk of compromising usability for the sake of eye candy and pushing the metaphors too far so that they no longer make sense. The way that disks were ejected by dragging them to the trash in the original Macintosh is a traditional example of this.

We decided to continue, however, because the potential experience that we believed that could be achieved by this approach was so tempting and we believed that usability issues could be sorted out, given that the risk was recognized early on. After all, we figured that intangible nature of the electronic rental model was new to most of the parents, so it was useful to incorporate a familiar real world component of game package to the service.

While the strategy plane was still a work in process, I took a top to bottom approach to the UX elements model and tried to find out the interaction logic the shelf should have. I showed an image of a shelf full of games to various people and asked what they expected to happen when one was clicked. The general response was that clicking should mean picking the game up to one's hand and hence make the package larger. The large packages looked beautiful but they also consumed a lot of space without providing much real value. Similarly to how Apple had decided to turn around the CDs to reveal the contents, we ended up making the game package look like a real one from behind, too.

On the backside we could provide information about the game. The question arose what kind of information should be provided. We observed parents in traditional game stores and noticed the difficulties they had when choosing games for their

children. The same was echoed by various articles we read, especially that of Ermi & al. (2004). Parents generally had little idea what the games were all about and the descriptions behind the game packages were written so that they seemed intriguing to the players but provided little information for parents.

5.2.3 Information for parents

We understood that by providing the parents non-biased, factual information about the games, we could create value that they would not get elsewhere. If we succeeded in creating a system where parents themselves would want to comment the games and provide suggestions to others, we could end up with a truly valuable service. What is more, we could provide exact logs about the games that a child had played. This information was collected automatically in the background to pay the revenues for game publishers based on the attention their games received. By making the information visible and designing tools for utilizing this we could provide additional value to the users. It was at this point that we started to understand that though the business of renting games online had not been that successful, providing the means for parents to understand and guide the gaming of their children might as well be.

The discussion about the age limits was active during the fall in the media and we wondered, whether the parents should be able to bypass the official age limit of a given game. We figured out that because they could do it by entering the wrong age for their kid or letting the kid use their own account for gaming anyway, it was better to have a method to allow certain games on a game-by-game basis.

For the focus group organized for parents a quick interactive prototype about the shelf was created. The reception was positive. Another prototype was created to demonstrate the idea of providing the parents information about a forbidden game for which their child had requested an allowance. The idea was well received but it turned out that the brutal description of the game *Grand Theft Auto: Vice City* was too much for many.

A lot was learned about the time limits that parents had set for gaming and about the dynamics how the kids go to a friend's place to continue after they have used their own quota. The challenge of controlling the kids' playing was very real. Some mothers had even taken drastic actions and locked the game systems in a closet to limit gaming. The general assumptions seemed to be accurate: the mothers had a

more negative attitude toward gaming whereas dads considered it harmless and liked to occasionally play themselves, too.

Various educative games, or *edutainment*, were generally not considered interesting. Few had experience with such titles and those who had, commented that children tended to find them boring. This was our own perception as well but we nevertheless considered that including such titles in the collection might provide arguments for subscribing the service for some parents.

Game consoles were present in many families but surprisingly this was not seen as an obstacle to subscribing to the service. When there were several children in a family, they often ended up fighting on gaming turns, so another option for playing was considered welcome. This showed again how easily business case calculations based on loose assumptions can go wrong. Originally we had counted out the households that had game consoles but it might as well be that it was precisely those households that were interested in gaming and hence potential GOD customers, too.

The last focus group at this point was organized with children with their ages ranging from 10 to 14. To make the recruiting process easier, we asked the parents who had taken part in the earlier occasion, if their children would like to come. Apparently, the parents had considered the service to be acceptable, since they were happy to have their children take part in the focus group.

The results were supportive. It turned out that children at this age were less interested in the age of the games. They might happily still play their old favorites just because they happened to like them. What is more, the kids were active to play various simple casual games available free online at services such as Miniclip.com, even though the quality was not at all at the level of the more hard-core console titles.

Some sort of console existed in most of the families but children needed to take turns with their siblings to play. Meanwhile, the simple web games were considered as the next best thing and our offering was seen as more lucrative. The fact that new console games could be bought only so often due to their high price was another case in point. The single most important issue that was confirmed is that content indeed is the king. No amount of great design of the service in general could ever overcome the game selection that was considered uninteresting.

The focus group also taught us that children of this age were able to understand rather abstract questions surprisingly well, given that the concepts were demonstrated well-enough. The challenge was that they did not often feel confident enough to speak in a situation where there were several unknown people in the room. Internally, it seemed curioysly that when we told that we had tested our ideas with children, people considered that we were truly putting effort on our studies. As if testing with adults was somehow less valuable.

The children were not specifically interested in the social elements that we had envisioned but we assumed that it was also due to the abstract nature of the issue. Given that none of the tested groups had been specifically interested, it can be asked why the idea was not given up altogether. We believed however, that some kind of social aspect was likely useful in the long run and decided to keep examining the area. One important benefit was considered to be that this way the opponents of multiplayer games would not be completely anonymous, as they were already known via the virtual community. This kind of phenomenon had been recognized by following some gaming related web forums.

The web service Ning.com seemed useful for quickly setting up a test environment to work as a community. Ning lets the users create their own simple social web services, containing features like personal profile pages and possibilities to write private messages, have discussions and share media. This was considered useful when testing the social behavior in practice without spending resources on developing a test environment of our own. After all, to provide the realistic experience of dynamic community, a functional prototype is needed. The disadvantage of Ning was that the general structure of the site could not be configured enough for our needs. Ning also only supported some of the most generic features of social web services, so it was not suitable for testing some of our more demanding ideas.

5.2.4 Defining the product strategy

Finally, having collected insight by focus groups, observations in stores, reading relevant articles, analyzing existing services, following related blogs and forums, and discussing with both teachers and hardcore gamers, we were ready to crystallize the three fundamental aspects of the service. It was given the project name Pelihylly

(Game Shelf) because of the interface metaphor that was chosen. The three fundamental points were formulated as (Figure23):

> **I'd like to get a shelf full of games**, referring to the idea of large selection of games always available and to the way that the games could be managed through a visually attractive interface.
>
> **I'd like to guide and understand my kids' gaming**, referring to the tools that give the parents the possibilities to see what their kids play and get objective, fact-based information about these game and also how the parents can limit the playing when necessary.
>
> **I'd like to share my gaming with others**, referring to the idea how the social component of the service makes it easy to find friends who have the same games available and who are interested in similar games than the user herself.

When considering the UX elements model, this was our take on the vision document from the viewpoint what was to be offered to the users.

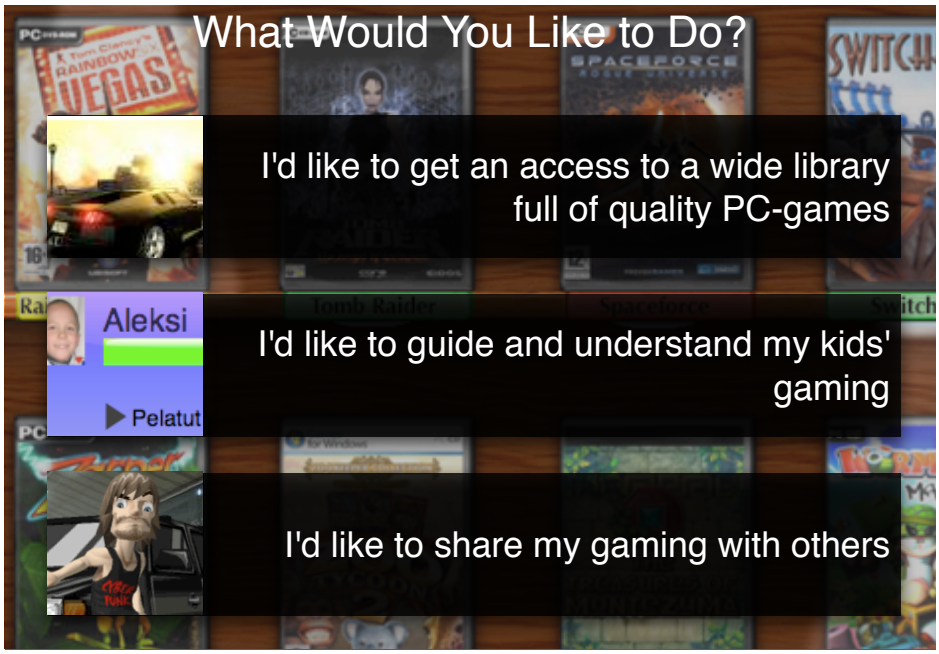

Figure 23 The three main components of the service were defined.

Considering the other side of the strategy plane, what the company wanted from the service, there were two alternative approaches. If the service was used as an instrument for defending the existing broadband business, it would make sense to only provide it to company's broadband customers. If the service was believed to be a profitable business alone, however, it would be better to go with a network-independent model and not limit the market to the existing broadband customers. This decision would crucially affect the service development, as a bundled service does not need to directly compete against others but it rather has the role of an auxiliary bonus instead. Therefore a smaller-scale execution of the service might seem to be a more viable option in this case.

By taking the viewpoint of a consumer to the matter, we assumed that that content comes first; that people do not care to switch the internet service provider just to be able to try out a web service. After all, changing the operator requires some effort, and might not even be possible sometimes. At least it takes time before the connection opens and when web services are concerned, people expect them to work instantaneously.

This assumption was well supported by the results of our focus groups, where the question was explicitly asked. Also, observing the reactions online a couple of years earlier when Elisa had opened its music download service Jukeboksi that was initially network-dependent, we found out that people had a hard time understanding why the use of certain web service should be tied to the operator.

Keeping the service available to everyone but making sure that by switching to a speedy Elisa connection the experience improves as the download times drop was considered the optimal solution. The traditional approach of giving Elisa customers discounts had the problem that after the discount is big enough the customers of other companies would feel that the deal is unfair, and in the end the service would effectively be network-dependent again.

5.3 Conceptualizing the opportunity

At this point the strategy was clear and it was the time to create the first full mock-up that incorporated all the functions into one interface. I put together a 10-minute long demo video, which showed off the three main areas of the service. Parts of the

interface were more refined, while others were just visual placeholders or screen captures from the created Ning test site. The video, acting as an enhanced vision document, turned out to be useful in communicating the big idea and the implicit requirements of the service for partners and test users later on.

5.3.1 Crafting the shelf

The actual development of the user interface began by designing how the shelf should operate. Based on the requirements distilled from the focus groups and our own experiences with the tested existing services, a list of use cases was created. The challenge with the shelf view was that it was not specifically space-efficient and there was a large amount of games to be browsed. The solution was seen to be to provide efficient tools for searching and filtering the games.

The problem with many of the current services was that they only provided searching games by their genres. Game genres are often rather ambiguous and it can be hard to exactly classify games into certain categories. A more flexible solution was considered to be achieved by using tags or keywords instead of fixed categories. This way each game could be a part of several categories at the same time. What is more, following the strategy, we wanted to emphasize the role of age limits and multiplayer options. Sure enough it should be possible to filter the game selection on this basis, too.

Several iterations of filter designs were created before a satisfying solution was found. One issue was, whether we should allow separate AND and OR operators between the features like some benchmarked database applications did. This turned out to be confusing to many, so we settled to an implicit solution. The items grouped inside one category in a filter were combined with OR operators where applicable and the different categories were in turn combined with AND operators. This way one could search for games that were either of the type action *or* adventure *and* suitable for the 8-year-old kid of the family.

Another challenge was how to maintain the simplistic, spacious look of the shelf while still providing enough information (Figure 24). Several existing services only provided various pieces of information on each game's specific page but we wanted to bring this information one step closer to the user, requiring one click less and providing a holistic overview of the situation. This information included information

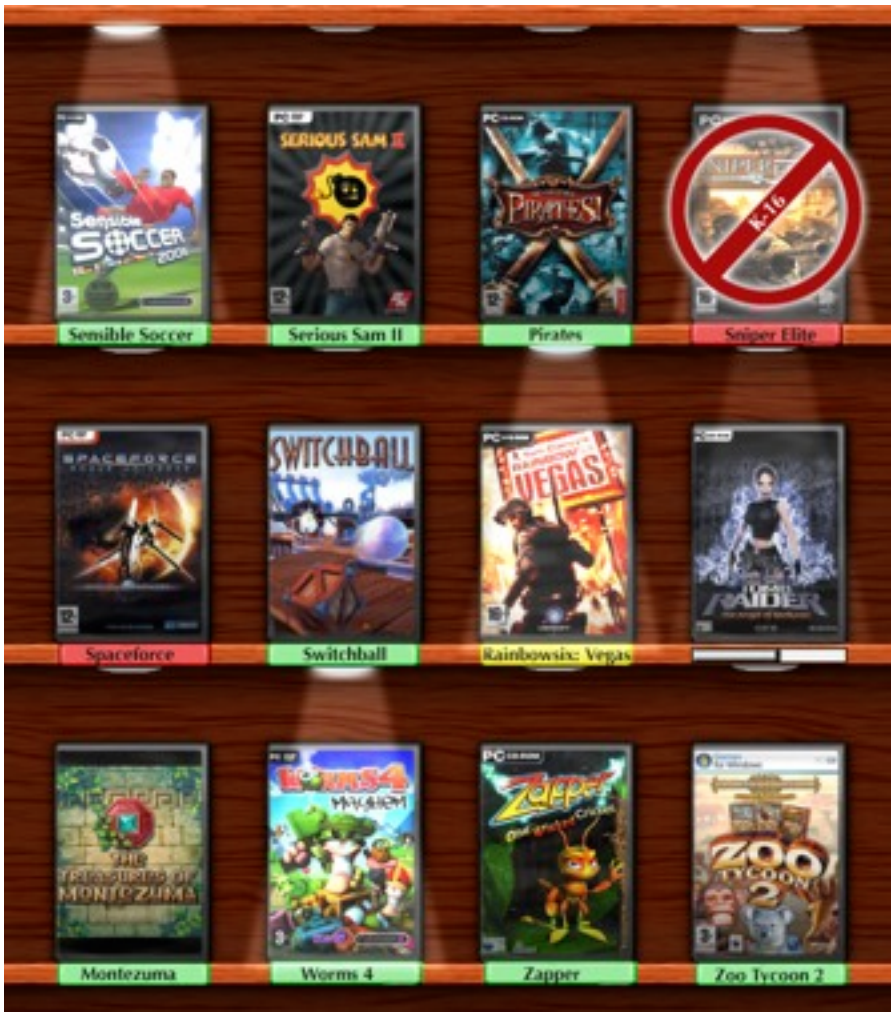

Figure 24 Providing enough information while maintaining the spacious look was one of the challenges for the shelf design. (The original shelf graphic is by Delicious Monster, from the application Delicious Library.)

such as age limits, whether the game would work on the current computer and whether the game was already downloaded or currently being downloaded.

The solution I ended up using was to color code the labels of the games. Green would mean that the game runs well, yellow that the computer meets the minimum requirements and red that the game would not run at all. The forbidden games were indicated with a symbol resembling a traffic sign. I experimented with and idea of providing virtual cupboard for forbidden games but we considered this to be pushing the metaphor and unnecessarily complex to implement (Figure 25).

Following our aspiration of delivering an interface which did not sacrifice efficiency for looks, we considered it problematic if the user had to always open the game

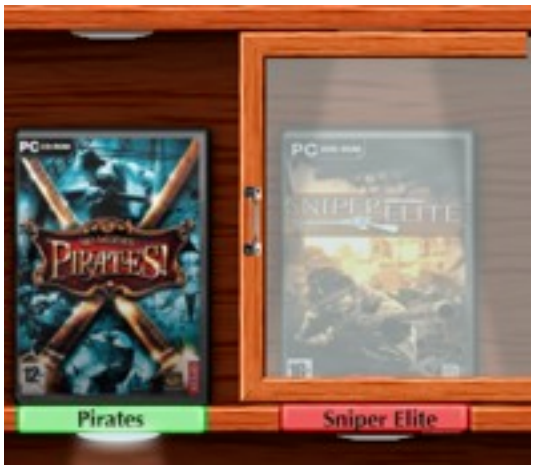

Figure 25 A cupboard for forbidden games was considered to be taking the metaphor too far.

package and only then be able to select *download* or *play*, respectively. As a shortcut we designed a button that became visible when mouse was hovered on the box. Clicking this button would initiate the download or start the game, while clicking the box would open it.

One important metaphorical question that we faced at this point was to decide what would be shown on the users' shelf: the games she had already downloaded or the games she had the right to download. Originally, the need for shelf emerged from the fact that the existing services did not provide any handy way of seeing the games that one had downloaded. Hence, I envisioned the shelf to be the place where one can see and launch the games that are downloaded.

In this metaphor the web site with the "store shelf" would work like any web store. When choosing the game it would be delivered to the user. This time only much faster than with a normal web store, selling physical goods. Compared to several days that it takes to ship a product from a physical web store, it would not have felt that bad if the game download might have taken up to several hours.

The problem with this model was that while it was well suited for selling individual games, it was not optimal for the rental model. It makes sense that the game moves to user's shelf once he has paid for it. In the rental model downloading a game and paying for it are not related. Further, one of the main arguments of the rental model was the experience that one gets much for little money, even if one only uses a

fraction of the whole selection available. Hence, we wanted to give the user the feeling that he truly *has* all the games in his collection. This was why it made sense for the home shelf to contain all the games that were included in the subscription. It is worth noticing how these two inherently different conceptual models were able to exist inside the project group for more than a month due to lack of an explicit documentation.

To tackle the problem of providing the information of the downloaded games, I came up with a solution of adding lights that illuminated the games that were downloaded and hence playable right away. The analogy felt a bit far-fetched but understandable and provided for a beautiful execution. To make the connection of the light and the downloading of the game more obvious, we came up with the idea of letting the light start pulsating smoothly when the download was initiated. This way, a quick glance at the shelf was enough to tell whether a game was downloading and no additional step to the download manager was required like in the existing solutions. By keeping the pulsating soft, we were also able to avoid causing distractions. Come to think of it, this blinking is highly analogous to the way that in Mac OS X an indicator pulsates in the Dock while applications are being launched.

When the shelf design had been refined to a level considered adequate, a usability test was arranged. The goal of the test was to validate that the problems that had been recognized in the heuristic analysis of the existing systems were truly problematic. We also wanted to make sure that our initial suggestions of fixing some of the problems with the shelf concept were indeed better than the original solutions.

The test subjects were recruited from a local university of applied sciences, mainly due to its convenient location. It was not considered a problem that the participants were more advanced users when it comes to web services than the majority of our target group because the goal indeed was to validate the existing problems and get confidence that our initial solution was better.

The test included tasks like understanding the general idea of the service after surfing the site freely for a while, subscribing to the service, finding games based on various criteria and finally downloading and launching games.

The results were promising. The problems that had been recognized in the existing services were problematic for many of the test users and further problems were

discovered. The shelf was liked and the filtering method considered easy and effective even at the rudimentary state where it was at the time of testing.

5.3.2 Refining the shelf

After the promising results from the early usability test, we went on with the design. One point where user experience and marketing points of view clashed was the location of the search field. The search field was supposed be dynamic by nature, filtering the visible games that matched what was typed in the field. Considering usability, I suggested placing the field to the top right corner, above the shelf where it could be easily found and quickly accessed. From the marketing point of view this was considered problematic: it would be a likely scenario that a new user comes to the site and tries to see whether the selection contains his favorite game. Having tried a couple of games without success, the user might leave the site, frustrated.

On the other hand, if the search field was placed in a drawer where the filters were situated, it was argued that the potential customers might find interesting content with the filters and consider the service even though it does not feature his exact favorites.

This dispute was never finally solved. One possibility to alleviate the frustration the user gets for not finding what he is looking for would be to automatically suggest games that are similar to the one searched and are available in the service. This kind of feature was considered useful in general. Supposing that someone has not been following the game scene since 90's but used to like *Command & Conquer: Red Alert*, he could enter the name and see what the service recommends. This kind of functionality would have naturally required some additional technical implementation and we were not sure if it was worth it.

As the prototypes that were created were based on different technologies than the final service could be built on, it was important to bear in mind that the final design needed to be implementable. Modern web technologies were investigated and services were hunted that did similar things that we envisioned. Especially for the live filtering we were able to find many examples which gave us confidence that we were not trying to create anything excessively utopistic.

One of the usability issues related specifically to Flash is that it does not support tabs in browsers. It was assumed that some users might want to open different interesting looking games into different tabs in a similar way that one might pick several games from a real world shelf and hold them in one's hands. To allow for similar kind of behavior in case that a Flash-based implementation was chosen, a specific side bar was designed. The bar made it possible to pick apart several titles at once and also doubled as a visual history view. The solution was considered complicated by some of the team members – who were not familiar with utilizing tabbed browsing themselves – but the concept was never actually tested.

Another idea that was not included in the final design but is still worth mentioning is that of a *conveyor belt*. When planning the option where the games would be sold separately, a traditional shopping cart or shopping basket was considered lacking because it does not show its contents visually. Hence, a conveyor belt was suggested as a metaphor for games that were soon to be taken through check out. This would have simultaneously implied that this store has no queues.

Even though the final shelf design was rather refined, several important questions were left unanswered. These were related to the backsides of the game packages. More abstractly put, the issue was that the concept of the shelf was thought of at first before the structure plane of the site was ever designed. The original idea was that in addition to the packages, the games would have had actual separate pages in the service. Deciding what to include in the game boxes and what to leave to the separate page was difficult and lead to a confusing general structure, so eventually it was decided to only utilize the boxes.

In order to make room for everything on the backside of a game box, a tabbed structure was introduced. Nevertheless, there was certainly a lot on information to be presented in this limited space and several questions were never ultimately addressed. The problem with the game package metaphor was that it wasted space that could have been used if the same information was presented on a normal web page. The shape of the game package differs from that of the screen, which means that the area next to the package is necessarily wasted (Figure 26).

What is more, it was not clear what should happen when one clicked to a link pointing to game that the service suggested to be similar to the one at hand. Should the package of the new game open and the currently opened disappear? How could

Figure 26 The game box metaphor wasted space that could have been used with a more traditional approach.

this be undone if the click was accidental and the technical implementation broke the back-function of the web browser? The sidebar would have helped in this situation, as the currently opened game could have been moved there. It is likely that there would have been a need for some kind of external back and forward controls, which would not have suited to the physical world metaphor too well.

As the community features were not intended for the first release version, the designs were left largely at placeholder level. It is unclear what should happen, when an image of a friend is clicked, for example. It is not a good idea to move to the profile page of the friend and forget where the shelf was. On the other hand, opening links to new windows is not exactly recommendable, either.

All in all, by this point there were so many assumptions made after the initial usability test that it would have been necessary to test the shelf design again. It was not even clear whether all the designed searching and filtering options were really needed or if the selection was eventually that small that they would have become excessive. Some ad-hoc tests were done by presenting the ideas to people who had commented the designs along the way but a decent test would probably have revealed several existing problems.

5.3.3 The site structure: first impression and ordering the service

After the shelf component had been designed to the point described above, it was the time to move on. Early on, it was decided that the community components of the service were not essential for the first release of the service. Hence the design was focused on the shelf component first. The next step was to design the rest of the site so that it would effectively communicate the idea of the service, make the subscription procedure smooth and support the additional tasks, not related to the shelf.

We asked for our in-house graphic designer to help with creating the visual look for the service. Because he had not been involved in the design process from the beginning, it turned out to be problematic for him to fully understand the role of the shelf we had been envisioning. Our approach was more application-like but the designs reflected the conventions of traditional web sites. The graphics designer had the history of designing the interaction along with the graphical layout of web sites and it is possible that he felt it restrictive that we offered him a rather thoroughly defined interaction logic that was only missing the visual plane.[23]

A simple web survey was created and various visual designs were presented to people who had participated in our focus groups or been otherwise involved in the design. It turned out that a simplistic sketch, featuring the original shelf, was the most liked approach, so we decided to keep elaborating based on that.

Much attention was put to designing the initial appearance that the site visitor would get from the service. As the shelf was meant to be the main element, catering for the imminent wow-effect and also because the shelf was not especially space effective, we decided to give it a prominent position in the final design and maximize the size it would take. The idea was that when a new visitor enters the site, the first thing he likely ends up doing is to start playing around with the shelf.

In order to provide more information about the service, we included an optional introduction video on the shelf. The video was supposed to tell the three main points of the service so that the user could select himself what he was most interested in learning. To make sure that the first impression would be positive, the shelf sorter

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[23] Another reason was that he was so busy with his existing work that he could not fully devote himself to the project. Despite his hurries he was able to provide us with some nice drafts for the logo.

menu was set to show the games based by their popularity by default. This way, the best games were situated at the top rows of the shelf and were always visible without scrolling.

The procedure of subscription and selecting the right game bundle was also carefully designed. At this point the virtual euro model was forsaken, as it was seen to be hard to understand for many, and complicated to implement due to various business reasons. Instead, we took a more traditional approach and provided separate bundles that would cater for the different implicit user personas that had been formed during the development.

The bundles were created so that each of them contained the games of the previous bundles. This was done to always make it reasonable to upgrade the subscription to a more expensive collection. Bearing in mind that the young adults did not want to pay for content they do not use, it was considered necessary to offer the option to drop the kids' content from the order and get a small discount.

The interface for subscription was designed so that it let the user browse the games that were included in each bundle while making the selection. One problem with the existing services was that at the point of decision, they provided little information on the content that was included in various packages. The procedure was also designed so that it minimized the effort required from the parents to set up a new account for their children – hence ensuring that the feature would end up being used.

When it comes to payment schemes, continuous subscription is naturally the easiest to organize but we found out a need for prepaid option, too. This would make it easy to buy the service as a present for a certain period of time. It would also be possible to temporally upgrade the service to a larger bundle. This was another situation where the design of the interface was highly dependent on the decisions concerning the commercial issues of the service.

All in all, the way the structure of the site was created followed the bottom–up approach in Garrett's terms. Various often implicit requirements were considered and grouped together so that the overall structure seemed reasonable. Clearly, conducting tests for the structure of the site would have been necessary before starting the implementation.

5.4 Realizing the product opportunity

At the time of this writing, the implementation of the product has not been started and it is unclear if it ever will. Some tidbits from the planning of the implementation can be shared, however.

Having understood that quickly copying one of the existing games on demand services and bringing it to Finland was not the recommendable way to go, as we were able to create more value by designing the service from ground up, we started to investigate how to technically implement the service. Documenting the requirements in a way that the interface considerations could be included at the necessary level of detail turned out to be challenging – especially as the implementation was to be done by an external partner. The template that was used was suitable for listing technical requirements but it was considered awkward for user experience documentation. In the end, the demonstration video turned out to be the most effective way of communicating what we were up to.

Before the actual implementation project a specific definition project was to be organized. During this time the interface requirements would have needed to be concretized and the structure thoroughly documented. This experience was missed, as the project was put on hold before.

In order to get the GOD technology provider convinced that our solution would be worth the adjustments that it necessarily would have required, the problems of the tested existing services were carefully documented. As the implementation project has not been started, the specific technical challenges and the tradeoffs needed remain unknown. Therefore, it is not possible to estimate the actual business case for user experience: how much extra it would have cost to implement the designed features and what kind of benefits they would have brought in return.

6 Analysis

In this chapter the results that were got from the interviews and the case study are analyzed. The research questions presented in the beginning were:

1. What is the current role of usability work in Elisa and is it considered adequate?
2. What benefits can be gained from an early focus on user experience when developing new services and discovering product opportunities?

The first question is answered based on the results of the interviews with some of the key employees in the company, as reported in chapter 4. The question number two is answered based on the experience gained by the project Game Shelf, presented in chapter 5.

6.1 Usability at Elisa

The research question was further divided into three questions that were to be answered based on the interviews:

- What is the current level of usability maturity in the company?
- Which reasons have led to the current situation?
- How relevant an advantage is usability excellence deemed to be in new service development?

6.1.1 The level of usability maturity in the company

When is comes to usability at Elisa, the situation seems to be rather paradoxical: on one hand the company officially states that it wants to be the service leader and *make it easy*, on the other hand it seems that this is often not the reality. The observation is supported by the fact that the answers to the question about the level of usability maturity were so divided. The ambitions are at a high level, and the way that ethnographic research is seen as a useful tool for collecting deeper knowledge about the customers follows the best practices suggested by both the current business and usability literature.

The problem seems to be how to utilize the results and turn the observations into great services. It is possible that the company has not fully recognized the importance of user-centered design. Coming up with a innovative idea is only the beginning and executing it optimally is yet another story. The companies that have reached the strategic level of usability work have a long history of user research and user-centered design behind them and it seems that there are no shortcuts to achieving this.

6.1.2 The reasons behind the current situation

The main reason for the scattered usability activity is that the role of usability work is not explicitly stated in the company. The way in which the traditional product life cycle model was seen to be awkward and the changes to existing products slow and expensive seems alarming when considering the development of usable products. Experience shows that achieving usable results requires iteration, so it is certainly problematic if the processes do not allow for this. Moreover, as the usability requirements are not included in the official process templates and are hence nobody's responsibility specifically, it seems unlikely that situation is about to change by itself.

The small number of internal usability experts makes it challenging to introduce more user-centric practices. One of the reasons why no more prototypes are created and tested is that there are little people with such skills. Utilizing external companies involves a threshold, especially when explicit user experience documentation is not required and the product manager lacks the experience on the topic. Currently the Production unit caters for the implementation of the traditional network based services and it can be asked whether the implementation of various higher level services for web and mobile platforms should also be organized in-house to some level.

Another reason is that even though usability is seen as a relevant goal, the existing methods are not always believed to provide useful results. The fact that most of the respondents were not aware whether user experience requirements can be documented in a meaningful way, implies that the they did not have experience from a successful rigorous user-centered design process. Usability might have been given a bad name by some unsuccessful earlier experiences.

6.1.3 How relevant an advantage is usability considered

The positive side of the matter is that those interviewed recognize the need for user-centeredness in the modern service development and consider the lack of usability one of the main reasons that hinders the wider adaption of various services. If the top management sees that the issue is worth fixing and provides the time and resources required to better take users into account, the interviewed managers will be ready to support the idea.

The way that Moore's chasm model was known by everyone and accepted by the majority of those interviewed, indicates that it is a useful way of communicating the role of usability when targeting the mainstream market. Respectively, the Kano model turned out to be a useful way of communicating how great experience is able to delight users.

It is encouraging how the general idea of the chair model of technology, marketing and user experience was positively received, even though more concrete measures for user experience were requested. The aforementioned hierarchical model of elements of user experience by Garrett (2003) provides some answers to these questions by giving examples of concrete documentation of user experience at various stages of the process

The proactive user study that had been experimented in the form of the Customer day was generally considered useful. Customer day was a special case and it is likely that in the future the studies last longer and involve considerably less people who also have more experience in observation. This is likely to solve some of the problems found in the original study. It seems also to be understood that while such studies are useful for recognizing phenomena which might lead to opportunities, other methods exist for more detailed analysis during the actual development.

The amount of skepticism that the idea of a centralized usability group faced is rather surprising. It is likely that this was due to earlier challenges with integrating the R&D function with the current business. It is likely feared that a centralized usability group would restrict itself from the rest of the organization and only demand changes without bearing any responsibility. The most well-received organizational model was a matrix organization where the central usability group is situated in the R&D unit

and individual usability experts work at the various business units, taking part in development projects.

The answers emphasize that without the support from the top management, nothing will change. This is well in line with the idea presented in literature: there is a need for an executive champion who drives the change. The fact that the general idea of the importance of usability was accepted but concrete measures were required speaks for the other approach suggested in literature. Creating showcase projects and demonstrating continuous success by paying attention to usability is a way of getting recognition to the topic.

6.2 Case Game Shelf

The Game Shelf project provides some examples how paying attention to the users at the early stages of the design process can be used to generate additional ideas for the service. It also demonstrates the compromises that were needed to be done between user experience and marketing and shows how the user experience was seen as one of the key points in the strategy of the service.

6.2.1 User-centric approach at the fuzzy front end phase

The project demonstrates how user-centered approach helped us understand the reasons why some of the existing services had not fared that well and come up with the ideas that would let us succeed better. It can be argued that the innovations that were made were not that radical and it is debatable whether the service can be considered a strategic innovation at all. Certainly it would have provided additional value, not available elsewhere – especially if parents could have been involved in generating the information for each other – but the idea of renting games online is nothing new.

Another question is how relevant a role the Customer day study really had in discovering the opportunity. The study was more concentrated on finding the sources of frustration the people face in their everyday life and entertainment needs were therefore not specifically addressed. It is also debatable whether the ideas that were generated were caused by the focus on the user experience or on the marketing, when speaking in terms of Norman's chair model.

Then again, being a rather safe bet was why this concept was let to live as long as it did. What is essential is that the approach was that of asking questions, not that of providing solutions. After all, we were rather ruthless when killing our darlings and discarding ideas that turned out to be useless.

The way that user experience requirements and marketing requirements were managed to be woven together was possibly the greatest accomplishment of the project. The concept of user experience was something that was able to combine the marketing-oriented and usability-oriented viewpoints and little artificial justifications were needed to get the point through inside the design team. It can be said that user experience was one of the key components of the strategy of the service. This is also seen in the working title of the service, based on the chosen interface metaphor.

It is worth noticing that these ideas were only applicable when the service was intended to be a standalone service, not tied to a certain operator. Had it been bundled, it is likely that user experience would not have received such attention and the focus had been on issues like cost efficiency. However important the user experience was for the success of the product, it is also worth remembering that the single most important component was content. If the games were not interesting, everything else lost its meaning as well.

The spirit of the development team and the shared vision were the main reasons why the design process succeeded so well. Another reason was the lack of official procedures and the freedom of experimenting. Though the compromises between marketing and user experience were well sorted out, it is not specifically known what kind of challenges would have been involved in the actual technical implementation, as this has not been done.

6.2.2 The hierarchic structure of designing for user experience

The model of elements of user experience turned out to provide a good structure for understanding the service as a whole. In this project and in some similar earlier ones, it was noticed how the people not familiar with the model, or the idea of interaction design in general, might have asked for complete visual mock-ups of the services before it was even clear what the service should do. This implies that people still tend to understand the role of usability to be merely to make things pretty – not to make them work.

I ended up straying form the strict hierarchical order of the model when looking for inspiration from the analogous domains. This caused some confusion because the development team did not always understand that even though some things seemed ready, the actual structure might have been missing. On the other hand, coming up with visual designs featuring more than just dull rectangles was often necessary, better to be able to convey the experience the design sought to create.

The designs were not documented as rigorously as would have been useful. This is partly due to the fact that no suitable template for documenting interfaces existed but also because it felt that there was not enough time to stop and carefully document what had been decided already. This led to the situation where the rest of the team were not always aware how I had envisioned certain things to work. The aforementioned case of deciding what to show on the home shelf is an example of such a situation.

The lack of support for user-centered activities – both in terms of processes and resources – forced us to improvise and develop our own practices. It would have been better if I was not involved in conducting usability tests for the interfaces I had designed myself, for example. On the other hand, the lack of formal procedures gave us the freedom to experiment and find out the ways most suitable for us.

7 Discussion

This study has shown that though Elisa has seen the value of user research as a source for innovation, there are still challenges in integrating user-centered development to the existing processes. It was also seen how early user involvement helped us avoid the problems of existing solutions when designing our service concept. In this chapter the validity of the results is discussed. The used methods are also evaluated and some suggestions for the future are given.

7.1 Usability at Elisa

The results that were received based on the discussions with 13 Elisa employees that were well aware of the situation of the company are generally highly homogenous. This implies that they correspond to the situation in the company rather well and can be considered reliable. Some of the topics being sensitive by nature, it is also not possible to disclose everything. Nevertheless, the respondents boldly reported the problems they had encountered instead of shunning them and the company has been exemplary open in allowing to publish also the challenges that have been found to exist.

The usability maturity estimate can be considered illustrative. The criteria used were simple and various respondents commented that it was hard to choose a certain grade. The results are well in line with what was found out in the interviews, however, so the general observation that the usability work in a company is not systematic can be considered reliable.

To get to the level of strategic questions, the people who were chosen to be interviewed were project and business managers from various units of the company. It might have been beneficial to also discus the same matters with employees at lower levers in the organization. Then again, the actual hands-on experience that was collected by working on the Game Shelf project provided this kind of knowledge and was in line with the interview results.

The method of combining a presentation and a semi-structured interview turned out to work rather well. The sessions were tried to be limited to one hour but there were so many topics to discus that this often was insufficient. Fortunately many of those

interviewed were able to spend some additional time to provide their view on the matter. The interviews were started possibly a bit too early in the process, as some essential parts of the theory were included after the interviews were over already. On the other hand, some of the interviewees gave valuable suggestions of suitable material for the theory part.

7.2 Case Game Shelf

At the moment Game Shelf has not been completed and brought to market which makes it hard to prove whether the chosen user-centric approach was truly able to contribute in a meaningful way. The service would certainly have provided for a useful showcase project for user-centered design if it ever was completed. The market data missing, it can only be pointed out that the early prototype of our approach was found more usable than an existing service and the general response to several of our ideas was positive along the way.

One might argue that the fact that the project was put on hold implies that though the external response toward it was positive and the market seems to be opening, the company failed to see the value that the extensive user-centeredness brought to the concept. Being involved myself, I am disqualified to analyze whether it was the design process that failed to deliver results, the company that failed to see the value, or neither.

It is also possible that the design process was successful and the company made the right decision by deciding, not to realize the service at the time being. It is the nature of new service development that not everything gets developed and it can also be considered a success to decide, not to do something after closely examining the opportunity. Unfortunately, this way one can never say for sure whether the decisions made in the process were right and further, whether the approach was successful at all.

7.3 Suggestions for the future

It is encouraging to see that Elisa has recognized the importance of the profound customer knowledge when trying to find latent needs and opportunities for new services. Further, it is promising that ethnographic research has been found to be a

useful method for this. It is to be hoped that the company will also see the role of the user-centered approach in realizing these products and succeeds in incorporating user experience requirements in the development processes. Most certainly there exists demand for an operator that pays attention to user experience and truly *makes it easy*.

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Appendices

Appendix 1. Interview template

The internal interviews with the 13 Elisa employees followed a presentation which dealt with similar issues than the theory part of this thesis. Along the presentation, questions were asked. The discussion was let to flow freely but the following questions were used as the structure for the interview.

Introduction

• Which three things do you consider to be Elisa's strengths when considering the development of new services for existing and new markets?

• Which are the worst weaknesses?

• How do you understand the terms usability and usable?

Usability and user-centered development

• What do you thing about the fact that usability is defined so broadly?

• What do you think about the argument that linear waterfall process is not ideal for service development?

• How do the processes used in Elisa support iterative approach? What kind of issues hinder iterativeness?

• What do you think about the argument that market research does not tell what users truly want?

• Do you think that the difference between the customer and the user is relevant? What about the trend of consumerization? Can you provide an example of a business application that is clearly not designed for the users?

Service design and user experience

• What do you think about the argument that consumers consider operators to be consumer-hostile (in Finland/abroad)?

• Can operators become truly interesting companies or is their role more akin to insurance companies and energy corporations?

• Can you provide an example of an experience with a product or service experience that has delighted you lately?

• Do you consider that Kano model is suitable for demonstrating how technology alone has lost its excitement value?

The chasm model

• Do you find Norman's interpretation of Moore's chasm model suitable?

• How do you see Elisa's role as packaging existing pieces into convenient solutions for mass market?

Usability ROI

• Do you think quantitative measurements are the way to demonstrate the value of usability work?

• Do you consider the described ROI approach a credible way of demonstrating the value?

Usability work and stakeholders in an organization

• Do you consider that the chair model of technology, marketing, and user experience is suitable?

• What is the role of usability or user experience in the current decision making process?

• How could it be better incorporated? What kinds of measurements would be needed?

• What do you think about the diagram of internal stakeholders of usability work as suggested by Kapanen? How does the information currently flow?

• How would you rate the usability maturity at Elisa using the presented definition?

• Is there enough usability competence in the organization to be able to understand the results and distill the requirements?

• Are there adequate resources for creating the prototypes and testing them and analyzing the results?

• Can you tell me where I should ask for help if I wanted to pay attention to usability in a given project?

Strategic usability

• Do you find that the idea of having an on-going user research initiative could provide useful information for new products?

• Do you think that the Customer day study could be used as a such source of insight?

Organizing for user-centered development

• How important was it that the people doing the research in the Customer day project were Elisa employees? Were HR issues more important than the actual results?

• What kind of organization do you consider would be best suited for in-house usability function?